

REVIEW of EDUCATIONAL RESEARCH

VOLUME XVII
1947

AMS REPRINT COMPANY
New York 3, N. Y.

AMS REPRINT COMPANY
New York, N. Y. 10003

Printed in U.S.A

REVIEW OF EDUCATIONAL RESEARCH

*Official Publication of the American Educational Research Association.
Contents are listed in the Education Index.*

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By National Education Association of the United States, Washington, D C

Vol. XVII, No. 1

February 1947

Psychological Tests and Their Uses

Reviews the literature for the three years ending July, 1946. Earlier literature was reviewed in Volume II, No. 3 and No. 4; Volume V, No. 3; Volume VIII, No. 3; Volume XI, No. 1; and Volume XIV, No. 1.

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By National Education Association of the United States, Washington, D. C.

Vol. XVII, No. 2

April 1947

Finance and Business Administration

Reviews the literature for the three years since the issuance of Volume XIV, No. 2, April 1944.

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Vol. XVII, No. 3

June 1947

Education for Work and Family Living

Reviews the literature for the two and one-half year period since the issuance of Volume XIV, No. 4, October 1944. Earlier literature was reviewed in Vol. XI, No. 4, Part 1 and Vol. XIV, No. 4. For reviews of literature before 1941 see previous issues on the Curriculum, Methods of Teaching, and Measurement.

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Official Publication of the American Educational Research Association.

Contents are listed in the Education Index.

Copyright, 1947

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Vol. XVII, No. 4

October 1947

Education for Citizenship

Reviews the literature for the three-year period since the issuance of
Volume XIV, No. 4, October 1944.

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Copyright, 1947

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Vol. XVII, No. 5

December 1947

Growth and Development

Reviews the literature for the three years ending July 1, 1947. Earlier literature was reviewed in Volume III, No. 2; Volume VI, No. 1; Volume IX, No. 1; Volume XI, No. 5; and Volume XIV, No. 5.

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INTRODUCTION

WHILE this issue of the REVIEW is essentially similar in scope and organization to the issue of February 1944, certain changes in organization and emphasis may be noted:

1. Additional space has been given to the measurement of personality and special abilities. Within the field of personality, extra space has been given especially to the topics of attitudes and projective technics. These changes reflect changes in research emphases during the last triennium.

2. There is no chapter devoted to the construction and use of psychological tests in the armed services. A separate issue of the REVIEW will cover this topic; in the present issue, only occasional or incidental reference is made to the findings or experience of the armed forces.

3. The former three chapters on personality have been converted to four separate subject-chapters on Personality Questionnaires, Interests and Attitudes, Rorschach Methods and Other Projective Technics, and Other Devices for Investigating Personality. The purpose of this change is fivefold: (a) to permit greater specialization by the reviewers: ("personality" now has such a broad, voluminous literature that division of labor is essential); (b) to encourage integration of the material on "construction and evaluation" with that on "applications" (formerly, these topics were treated in separate chapters); (c) to meet reader-interest and reader-expectations: thus, the reader interested in personality questionnaires may turn to a single chapter, and find his material there; (d) to provide the abstract-journals with chapter titles which are more specific and revealing than formerly; and (e) to reduce the overlap of bibliographic entries in the chapter formerly devoted to "construction and evaluation" on the one hand, and "applications" on the other.

The reader will miss a chapter on the interrelations and synthesis of test results. Research materials in sufficient amount to support such a chapter have not appeared. This has for some time been a major gap in the research on personality and intelligence testing.

While the prosecution of the war undoubtedly reduced the volume of published reports, there was no dearth of studies for the present issue of the REVIEW. As in previous issues, bibliographies have had to be rather sharply selective. The REVIEW, in fact, needs more space. More space is needed to permit authors to cite all the useful references, and at the same time present gracefully written, interesting, critical, and suggestive accounts. Thoughts take space; and we cannot limit the latter without sacrificing the former.

Finally, the chairman wishes to acknowledge the help of Dr. Harold H. Abelson, who has at many points rendered invaluable assistance in the preparation of this issue.

HERBERT S. CONRAD, *Chairman,*
Committee on Psychological Tests.

CHAPTER I

Overview and Comments

HERBERT S. CONRAD

OF THE BOOKS which appeared during the last triennium, at least five deserve special notice; namely, the volume by Strong on *Vocational Interests of Men and Women* (10); the monograph by Carter on *Vocational Interests and Job Orientation* (3); the monograph by Munroe on *Prediction of the Adjustment and Academic Performance of College Students by a Modification of the Rorschach Method* (7); the two-volume work by Rapaport, Gill, and Schafer on *Diagnostic Psychological Testing* (9); and finally, the volume by Crawford and Burnham on *Forecasting College Achievement* (4). It will be noticed that two of these books deal explicitly with college students; and a third, the volume by Strong, pays more attention to college students than to other groups. While it may be agreed that college students are important, we doubt whether they deserve such a concentration of research effort. By comparison, the work with high-school students is indeed limited.

An important, broadly inclusive bibliographic reference work is the publication by Hildreth (5).

Outside of the armed services (whose work with psychological tests will be covered in detail in a separate issue of the REVIEW), the chief increase of research during the triennium has been in the field of personality and special abilities. In the latter field, outstanding work was done in the development of visual tests for industry, in the development and refinement of color-vision tests, and in the verification of group-audiometer tests with school children. Outstanding, tho not conclusive, is the series of studies conducted under Barr's direction on the measurement of teachers' efficiency (see Chapter III). In the field of personality, expansion has been noteworthy in several directions:

1. There has been active test of construction, especially in the field of projective technics and of attitudes
2. There has been increased attention to the possibilities of using ability tests as measures of personality (both normal and abnormal).
3. Research, tho it does not appear to have kept pace with applications, has nevertheless been extended and improved.

In the very active field of the Rorschach Test, the author's claims for the Harrower-Erickson Multiple Choice Group Rorschach Test have not been borne out by other investigators (see Chapter VI). On the other hand, Munroe contributed an important study demonstrating validity for her inspection technic (7).

Little encouragement can be found in Chapter IV for the use of personality questionnaires; evidently the most careful research is needed to discover the conditions favorable to validity. Our guess is that, given

fully cooperative subjects who are not excessively abnormal, and given a well-devised, empirically checked questionnaire designed for the type of individual under examination, it should be possible to obtain useful information. In this connection, it is interesting to notice that both Adams (1) and Burgess and Wallin (2) reported fair-sized validity coefficients (.30-.50) for scales designed to predict marital happiness; and these scales contain many items from personality questionnaires.

The armed forces made extensive use of highly abbreviated tests—both of intelligence and neurotic tendencies. Special interest attaches to the usefulness of brief questionnaires (oral or written) for the “screening” of psychoneurotics: the results, as reported, were highly favorable—and the question arises why the armed services could get such successful results from brief questionnaires, when civilians have trouble demonstrating any validity for the full-length scales. The following possibilities are suggested for consideration:¹

1. The sample entering the armed forces was extremely heterogeneous, including at the lower end unemployables, loafers, “bums,” alcoholics, frank neurotics, etc. It would have been relatively easy, by any technic, to eliminate such characters.

2. There was some special compulsion on the parts of the subjects to tell the truth.

3. The classification required was very crude: no specific diagnosis was made, merely a classification into acceptable versus unacceptable.

4. There was overlap between the questionnaire items and the criterion; that is to say, the psychiatrist's judgment was probably based, at least in part, on the same types of questions as contained in the questionnaire. This leads to a spuriously high coefficient of validity for the questionnaire items, since it disregards the discrepancy between the psychiatrist's prognosis based on the questions, and the actual outcome.

5. Sometimes there was contamination of the criterion; i.e., the psychiatrist knew the results of the questionnaire, and allowed them to influence his decision. In this circumstance, a validity coefficient based on the psychiatrist's judgment as criterion begs the question.

6. Occasionally the statistical technic used to evaluate the efficiency of the questionnaire was faulty. Thus, a biserial r might be based on 100 normal and 100 abnormal individuals: when actually the biserial r should have been based on, say, 10,000 normal and 100 abnormal individuals (if the ratio of normal to abnormal was 100:1).

7. There is room for doubt whether the criterion relied upon was adequate. The veterans hospitals are extremely full—and not with patients screened and culled successfully by extremely brief personality tests. Very likely the armed services, in their use of the short methods, considered it advisable to reduce the number of “false positives,” at the cost of increasing the number of “false negatives.” If so, this represents an administrative adjustment to the uncertainties of the diagnostic technic; and the increase in the number of false negatives (some of whom doubtless ended in veterans hospitals) must be charged to the inadequacies of that technic.

A commendable trend during the triennium has been the increased use of multiple measures, or batteries of tests. Both Crawford and Burnham (4) and Rapaport, Gill, and Schafer (9) exemplify this tendency. When many measures are brought to bear on a problem, the opportunity arises for *differential prediction* in the field of abilities, and for more definite diagnosis and interpretation in the field of personality. In the

¹ This section was written with Albert Ellis

field of personality, the interpretation of data is typically subjective and usually not easily verifiable. In the field of abilities, the combination of the various measures into a single score tends to be mathematical or routine. Sometimes the objective test-scores of abilities are supplemented by impressions from interviews, recommendations, etc. When this is done, it is highly important to make sure that the supplementary data actually improve validity. The writer is familiar with two instances where the addition of interview data has reduced validity substantially, instead of raising it. Evidently what happens in such cases is that the supplementary data are allowed to have an excessive influence upon the final judgment concerning the individual's capacities or upon his final score. In this event, the supplementary data are worse than useless, since they have weakened validity, instead of strengthening it.

Probably the most fundamental need in the field of psychological tests today is the development of *reliable, valid, specific criteria* against which to measure the efficiency of tests. This need is urgent in the field of abilities, and still more urgent in the field of personality. Tests which aim to predict or measure a faulty criterion merely perpetuate the errors of the criterion. Perhaps one reason for the undesirably high intercorrelations among tests in a battery is that the tests have typically been validated against an unanalyzed, nonspecific criterion (such as average school grade or grade-point average). It is most essential that criteria, as well as tests, be analyzed into their component parts. We judge that the analysis of tests according to correlations with specific criterion-elements should prove as rewarding as analysis by the various self-contained systems classified under factor analysis.

The increasing use of factor analysis is evidence of its value for the statistical study of interrelations. Recent results from factor analysis have tended to reinstate the "general factor" to a position of importance, especially for samples drawn from the younger ages, and for samples widely heterogeneous in abilities. It is highly unlikely, however, that the "general factor" obtained in various studies is identical.

The original purpose of factor analysis was to lead to the development of *new* tests which should measure *more directly* the independent abilities identified by factor analysis. Lovell's (6) work reports an interesting and partly successful attack on this problem.

Chapter VIII describes a variety of interesting statistical advances. Unfortunately, a number of statistical fallacies marred several researches. Perhaps the most egregious is that of Piotrowski *et al.*, who tried out *many* Rorschach "signs" on a *small* sample ($N=86$) of mechanical workers, and concluded that *four* "signs" differentiated between the outstanding and the nonoutstanding workers; this differentiation had a "discriminative value of .846" (8, p. 150). The obvious danger of this procedure is the capitalization of chance; the obvious requirement is the validation of the four "signs" in a *fresh* sample. The "discriminative value of .846" may well be greater than the reliability of either of the four

"signs," or of the criterion of mechanical ability. One other error, sometimes made by those working with "screen" tests, must be mentioned. The important issue, with such tests, is usually the *number* of "false-positives," not the percent. If, for example, in a population of 10,000 children subjected to screening, the percent of "false-positives" is (say) "only 5 percent," the number of "false-positives" is 500—a very considerable number, for all practical purposes.

Space is lacking for further discussion of detailed results. Despite occasional cause for criticism, the advances of the triennium justify pride. What is needed now is a larger army of research workers, well financed and well organized, to tackle the numerous problems that still await solution.

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CHAPTER II

Construction, Evaluation, and Applications of Intelligence Tests

WARREN G. FINDLEY, WILLIAM W. TURNBULL, and HERBERT S. CONRAD

THE LAST TRIENNIUM has seen progress in all departments of intelligence testing. The reader can verify the vitality of the period by observing: the development of tests which incorporate new features or strike a new path; the determination of basic facts or interrelations; the closer quantification of knowledge, leading not merely to the addition of decimals, but sometimes to new questions or a new orientation (for example, determination of the correlation between intelligence and yearly learning-gains); the clarification or solution of some technical issues in test construction; some new discoveries or insights (e.g., the demonstration of a general-intelligence factor in adults, and the consequent elimination of "maturation" as an explanation of this factor at the younger ages); the use of samples which reveal greater insight into the problems at issue; and finally, the more adequate fulfilment of the scientific requirements of investigation. These advances are, of course, related *inter se*.

As mentioned in the chairman's Introduction, the work of the military psychologists in the armed services will be covered by others in a separate issue of the REVIEW.

Test Construction

New Tests

Group tests—Tiffin and Lawshe (112) prepared two forms of a brief Adaptability Test (35 items, 15 minutes). Reliability, either by the split-half or alternate forms procedure, was found to approach .90; data on validity were also presented. Another brief new test is the Thurstone Test of Mental Alertness (111) (98 items, 20 minutes), consisting of arithmetical problems, definitions, number-series, and antonyms; separate *L* (Linguistic) and *Q* (Quantitative) scores are obtained. Norms are presented for grades nine thru twelve.

Two nonlanguage tests were published: one by Pintner (92), the other by Penrose (90). The test by Pintner includes six subtests, and requires 50 minutes of working time; the test by Penrose includes only one type of problem (selecting the extraneous pattern of a series of five), and requires 30 minutes.

The Word-Dexterity Test prepared by Peterson (91) is a test of knowledge of the meaning of prefixes and suffixes; impressively high figures were obtained for both reliability and validity. The test developed by Johnson (61) was based on Dewey's well-known analysis of the reflective process. Test items were constructed to represent in the elaboration of a

single problem, typical good and poor alternative reactions at each stage of the thought process. This type of approach to intelligence test construction, involving the explicit application of a theory of thought processes, has been largely neglected of late, in favor of theories of the independent components (or "vectors") of intelligence.

Louis and Thelma Thurstone (110) published the *Chicago Tests of Primary Mental Abilities*, which exclude five tests from the 1941 edition, and take correspondingly less time (two hours) to administer.

A civilian edition of the *United States Armed Forces Institute Tests of General Educational Development* (121) has been made available thru the Cooperative Test Service of the American Council on Education. Separate tests have been issued for the high-school and the college levels, respectively. It appears that the tests on *Interpretation of Reading Materials in the Social Studies*, *Interpretation of Reading Materials in the Natural Sciences*, and *Interpretation of Literary Materials* could be used successfully as tests of intelligence or scholastic aptitude, for individuals with normal school experience.

Individual tests—Individual tests continue to be prepared (a) for the preschool group, (b) for "problem" children, and (c) for study of the abnormal or aged adult.

At the preschool level, Smith (104) presented a Test of General Information consisting of ninety-two carefully selected items. Shotwell and Gilliland (101) described a scale for the measurement of the mentality of infants.

Arthur (4, 5) presented a Stencil Design Test which offers opportunity for the clinical observation of problem-solving behavior, as well as yielding the mental-age level of the subject.

Specially designed for use with abnormal adults are the Goldstein-Scheerer Cube Test (40), the Weigl-Goldstein-Scheerer Color-Form Sorting Test (41), and the Goldstein-Scheerer Stick Test (42), all of which may be very briefly described as nonverbal reasoning tests. The Wechsler Memory Scale (124), yielding a Memory Quotient, was standardized in the same manner as the Wechsler-Bellevue Intelligence Scale. Hayman (55) recommended, as a sensitive indicator of mental deterioration, a test consisting of the serial subtraction of sevens from 100.

Abbreviated Scales

One consequence of the wartime need for personnel classification on a gigantic scale was the growth of a demand for rapid measurement technics. Particular attention has been devoted to the problems of deriving a serviceable abbreviated form of the Wechsler-Bellevue Test. Rabin (94) was among the first to undertake this task. He selected three subtests (comprehension, arithmetic, similarities) from the verbal half of the examination. A further abbreviation was effected by Cummings, MacPhee, and Wright (27), who dropped the similarities from Rabin's scale. Gurvitz (48) selected the Picture Arrangement and Digit Repeating Subtests as

an abbreviated Bellevue Scale. It may be suggested in passing that a study using the multiple correlation technic, and based on clearly defined samples, is essential if the problem of the most effective combination of subtests is to find a conclusive solution.

Using records for 500 mentally defective patients, Spaulding (106) found correlations of .96 to .99 between mental ages obtained from the full Stanford-Binet and those obtained by rescoreing the papers on the abbreviated scale. Spache (105) pointed out, on the basis of his results, that abbreviated testing was less accurate among bright children than among subnormals.

The movement toward short tests reached its logical extreme in the work of Hildreth (57), who developed *single-item* tests for the preliminary screening of naval recruits.

The place of sharply abbreviated tests in the main current of progress has yet to be established. The evidence indicates that the abbreviated version of a reliable test may serve nearly as well as the full test. But if precision of measurement should be needlessly sacrificed for administrative convenience in situations where even our best instruments are in need of refinement—the condition which usually prevails today—then the availability of short scales will prove a disservice to psychometrics.

Technical Considerations in Test Construction

One of the purposes of factor analysis is to lead to the development of new tests which should measure more directly the independent abilities identified by the factor studies. That even empirically selected tests are likely to have a somewhat complex factor pattern was demonstrated by Goodman (43). Lovell (73) undertook to “follow thru” the implications of factor studies by devising items which should specifically stress the characteristics of one factor (so far as these characteristics could be recognized). Her attempt was reasonably successful, if judged by standards appropriate to a pioneer effort; further work along this line appears justified.

Davidson and Carroll (29) investigated the contributions of speed and level of performance to time-limit scores on a number of relatively simple group tests. They found that speed and level scores were related to the extent of about .30-.50, and that both contributed to time-limit scores.

The relation between the number of response options in a multiple-choice test and test reliability was studied by Lord (70), who developed a formula to predict changes in the reliability of a test resulting from a change in the number of choices per item. The same general problem was treated by Ferguson (32), who indicated the maximum reliability that can be attained when multiple-choice items with 2, 3, 4, or 5 choices are employed.

Mosier and Price (86) made available a scheme for use in arranging response options of multiple-choice items, but noted various situations

in which complete randomization is not desirable. Practically negligible influence of the position of the correct option on the percent of subjects who select it was reported by McNamara and Weitzman (82).

Gulliksen (47) formulated three theorems describing the relation of item difficulty and inter-item correlation to test variance and reliability. He showed that decreasing the range of difficulty of the items tends to raise test reliability. Tucker (119) showed that under certain conditions maximum test validity is achieved when average item reliability is less than $+.3$.

Smith (103) showed that the selection of test items is very similar, whether an internal or an external criterion is used in making the selection. The correlation between the two criteria in Smith's study, however, was $.86$; a comparison of the correspondence in item selection under the more usual condition of lower total test validity would be desirable.

The appropriate difficulty criterion for the allocation of test items to the proper age levels in age scales was cogently discussed by Jaspens (60).

Problems in Test Construction

Foremost among the problems in test construction is that of lowering the intercorrelations among the tests of a battery, while raising the over-all validity of the battery. Recent years have brought greater emphasis on specific or differential prediction; such prediction depends upon reasonably independent tests; and the development of such tests depends in turn upon *reliable, specific, reasonably independent* criteria.

Another question relates to the timing of tests. In what situations, if any, are speeded tests preferable to unspeeded? To what extent does the answer to this question depend on the type of material involved (e.g., mathematics versus verbal aptitude), the sample, the purpose, etc.?

A basic problem is the relationship between recognition and recall as applied to testing. Courtney, Bucknam, and Durrell (23) attacked this problem, and found that scores on a multiple-choice intelligence test correlated more highly with multiple-choice recall (i.e., recognition) than with written or oral recall (free recollection of the same material). While this study is based on too few cases to be conclusive, it points up an important area for investigation.

Several other technical problems deserve notice. What are the rules that should be followed in item-writing? While item-writers undoubtedly develop a sense of the requirements of good items of each common type, no detailed, explicit codification of rules exists—which could be subjected to experimental verification and serve as a useful guide to the novice. Under what conditions do pretesting and item analysis justify the time and expense involved? Despite the paucity of evidence, the general value of pretesting and item analysis is one of the most firmly held dogmas among testers. What, exactly, is the best practical distribution of item difficulty from the viewpoint of test validity? What means can be

taken to minimize the effects of coaching for competitive examinations? Does the test-wise student who has attempted several standardized tests have a significant advantage over the "fresh" student who takes only one such test?

All the questions mentioned above take on added importance, in view of the increasingly widespread use of tests in education.

Evaluation

A survey of the literature of the last three years indicates quite clearly that the evaluation of intelligence tests tends to be limited largely to determinations of reliability, to correlations with other intelligence tests, and to correlations with school grades. Relatively seldom is a serious effort made to ascertain to what extent the test (or each separately scored part of the test) measures only one common factor—instead of a composite or medley of several factors. Less often is an attempt made to determine such matters as susceptibility to coaching, susceptibility to practice-effect, ease of scoring, arrangement of items in order of difficulty, validity of norms, the effect of the time-limit (or "speed" factor) on reliability and validity, etc. Practically never is any effort made to determine the effect, upon the subject, of his experience in taking the test (to what extent, for example, does the test stimulate or confirm feelings of inferiority and aversion to matters intellectual?). Perhaps it is too much to ask for a complete evaluation of any one test. In any event, some of the limitations of the account below must be charged to paucity of the pertinent research literature.

One excellent basis for the evaluation of an intelligence test is the correlation between the test and school grades or scholastic achievement tests. Studies of this type are covered in a subsequent section, under Applications of Intelligence Tests. Data on the constancy of intelligence ratings will also be found in that section.

Correlations with Other Intelligence Tests

Cursory survey of the literature is sufficient to show that the correlations between different intelligence tests are considerably lower than the correlation between repeated administrations or alternate forms of a good single test. (This generalization may not apply fully to the original versus the revised Stanford-Binet Test.) Since lack of space prevents a detailed citation of the various correlations, the interested reader is directed to the following references: 26, 28, 39, 53, 64, 71, 81, 98, 115, 116, 118, 122.

Correlations with "the Ability To Learn"

Woodrow, reviewing an extensive series of studies, concluded that "individuals possess no such thing as a unitary general learning ability," and that "the ability to learn cannot be identified with the ability known

as intelligence" (131, p. 148). This report by Woodrow has the wholesome effect of stimulating critical inquiry into the determinants of learning-gains; on the other hand, it is difficult to believe that long-time learning-gains in the general content of the school curriculum are unrelated to intelligence.

Reliability Coefficients

Relatively few reliability coefficients were published during this last three-year period. McCarthy (78) reported that the correlation between initial scoring and rescoring of the Goodenough Drawing Test of Intelligence, by the same scorer, was .94, and by different scorers, .90. The correlation between scores on two drawings done a week apart by the same children, when both drawings were scored by the same person, was .68. Tyler (120) found the equivalent-forms reliability of total raw score on the Terman-McNemar Tests of Mental Ability to be .94. The odd-even (corrected) reliability coefficient for the total verbal score of the College Entrance Examination Board's (20) Scholastic Aptitude Test was reported as .96, and for the mathematical score, .95.

Intercorrelations among Parts

Crawford and Burnham (26) found the intercorrelations among the separate parts of the General Educational Development Tests to be too high for the tests to be useful in differential prediction. The College Entrance Examination Board (20) reported intercorrelations among the verbal subtests of its Scholastic Aptitude Test to be about .75. Lorge (71) reported the average intercorrelation among the three parts of the Thorndike Intelligence Examination for High School Graduates to be over .90.

Norms

Rabin (95), reviewing the literature on the Wechsler-Bellevue Test, cautioned on the incomparability of IQ's from the Wechsler-Bellevue and the revised Stanford-Binet Tests (dull subjects tend to make higher IQ's on the Wechsler-Bellevue, and bright subjects, lower). Parkyn (88) compared IQ's from the original and the revised Stanford-Binet; he concluded that, for children testing under 80 IQ, the IQ's on the two scales are comparable with regard to implications for institutionalization. Wimberly (130) pointed out a systematic error or peculiarity in the Kuhlmann-Anderson Norms which makes it especially important that the appropriate series of subtests be selected for administration to each child.

Wide-Range Testing on the Revised Stanford-Binet Test

In a sample of 126 cases, Bradway (8) reported a correlation of .99 between IQ's obtained by standard versus wide-range testing.

Validity of the General Educational Development Tests

Three college studies (7, 26, 31) have been made of the Armed Forces Institute General Educational Development Tests. In general, the tests were found to succeed as measures of verbal aptitude, but to fail as measures of college achievement.

Organization of Abilities

Perhaps the most significant study of the organization of abilities during this three-year period was carried out by the staff of the Division of Occupational Analysis of the War Manpower Commission (123). Several experimental batteries were administered to a total of 2156 male adults aged seventeen to thirty-nine—either applicants for, or trainees in, Vocational Education National Defense Training courses. Analysis by Thurstone's Method revealed group-factors described as Verbal (*V*), Numerical (*N*), Spatial (*S*), Perceptual (*P* and *Q*), Aiming (*A*), Finger Dexterity (*F*), Manual Dexterity (*M*), and Logic or Reasoning (*L*). Two general factors were also found: one, a speed factor (*T*) (all the tests were speed tests, with time limits in the neighborhood of five minutes); the other, a factor that "appears to have some of the properties of Spearman's *G* . . . (and) to possess many of the properties that teachers, test examiners, and clinical psychologists would attribute to 'intelligence'" (123, p. 152). As the authors remark, the establishment of this latter factor in a sample of adults disposes of some theories that such a factor could be found only among children, and that it amounts to a common maturational factor.

Previous studies have led to the view that mental abilities become more specific (show lower intercorrelations) with age. Clark's (18) study confirms this view, and Reichard's (97) study provides qualified support. Blumenfeld's (6) study, presenting the intercorrelations among the subtests of the Terman Group Test of Mental Ability for Peruvian children aged twelve thru sixteen, runs counter to the bulk of evidence, by finding slightly higher correlations at the older ages.

It is sometimes hypothesized that high scores in mental tests are more likely to reflect special abilities than are average or low scores. On this hypothesis (and in the absence of counterbalancing motivational factors), bright children might be expected to exhibit greater variability in educational achievement than average or dull children. The results of Gray (45) fail to support this hypothesis, at least for young children, since in a sample of 600 sixth-graders she found that the dull, rather than the bright, showed the greater variability of achievement.

Halstead (49) has suggested the possibility of a physiological energizing or "power" factor (*P*), by which the *usable* intelligence of an individual is affected; and he suggests that brain injury, clinical depressions, etc., may spare the "primary" mental abilities while impairing the energizing factor or the usable intelligence.

Applications of Intelligence Tests¹

For the reader's convenience, the present section follows, so far as possible, the same organization as in Freeman's (33) 1944 summary.

Intelligence Tests and Educational Achievement

Elementary school—Allen (1, 2) explored the correlation of group intelligence test measures at the middle of grade one and at the beginning of grade four, with achievement on standardized tests in grades three and four. First-grade intelligence test indices correlated only .40-.50 with such achievement; fourth-grade intelligence test measures correlated approximately .70-.75 with current achievement results. The group intelligence test results correlated less highly with ability in arithmetic computation than other aspects of educational achievement involving reading.

Strang (107) reworked Gans' data on reading test scores and group intelligence test scores of 417 children in the intermediate grades to show the substantial variability in reading scores even for pupils whose language scores on a group intelligence test are limited to a range of ten months of mental age. She also reported closer correlation of language mental ages with scores on a standard reading comprehension test than with scores on an application-of-reading test (Gans-Lorge Test of Critical Reading)—a finding which may be added to other criticisms of group tests as measures of intelligence.

Woodrow (132) found that annual gains of 414 intermediate-grade pupils on the six subtests of the Metropolitan Achievement Tests, Partial Examinations, showed low intercorrelations (average=.12) and low correlations with Otis IQ (average=.20), except in gains during grade five. He argued from these findings that intelligence is overrated as a factor influential in yearly achievement gains. His case would have been clearer if he had used average MA rather than average IQ, since MA rather than IQ is the measure of immediate mental ability, and if he had also studied average gain on the six subtests against this more proper measure of intelligence. His study leaves open the possibility that intelligence, as measured by MA, promotes average gains while shifts of interest or emphasis account for low intercorrelations of subtest gains and consequent low correlations with intelligence.

Gray (45) studied individual variability from test to test in the six subjects tested in the Unit Scales of Attainment for 100 boys and 100 girls of high, of average, and of low intelligence. In all comparisons the lowest 15 percent on the Kuhlmann-Anderson Intelligence Test showed greater intrapersonal (intertest) variability in achievement than did those of average or high intelligence. The sexes were found not to differ reliably in individual variability.

¹ Special acknowledgment is made to Mrs. Willi Bosworth, librarian of Huntingdon College, and to Emma Louise Wills and Carrie Pursell, librarians in the School of Education Library, University of Alabama, for facilitating the reading on which this survey is based.

High school—Holzinger and Swineford (59) studied the relative effectiveness of a general intelligence test and test composed of general and spatial factors in predicting achievement in high-school subjects. Their finding that the spatial factor correlates highly with achievement in shop (.46) and mechanical drawing (.69) confirms much earlier research; the relatively lower value of this factor in predicting achievement in plane geometry should not have surprised them. The study further justifies factorial analysis and design of intelligence tests.

College and university—A cheerful note was struck by Durflinger (30), who found that the median correlation between intelligence and average college marks had risen from .45 (based on 100 correlations reported thru 1934) to .52 (based on 47 correlations reported since 1934). As Durflinger mentions, this rise may be due to the increased availability of tests especially designed for college students, to a general improvement in intelligence tests, to improvements in college grading practices, or to a tendency by instructors to allow their grades to be influenced by knowledge of the student's intelligence test scores—or possibly by all these factors in combination.

Crawford and Burnham (24) reported their experience with the Yale Battery and the College Entrance Examination Board Tests: on the basis of correlational data, the tests were considered adequate to help in the differential guidance of students into verbal, linguistic (foreign language), technical, and physical-science courses, respectively; Goodman (44), summarizing the results of several studies at the Pennsylvania State College, reported that "the Thurstone Primary Abilities Tests correlate, on the whole, as well as most standardized intelligence tests with criteria of college success"; it may be pointed out, however, that the other intelligence tests require considerably less time for administration. Goodman also concluded that "the Thurstone Primary Abilities correlate with individual college courses to some degree and can be used for prediction of success in these courses." Crawford and Burnham (25, Chapter VI), on the other hand, have questioned the value of the Primary Abilities Tests for differential prediction.

Hartson (50) showed that the prediction of general academic success at Oberlin College was more effective among groups with high "effort quotients" than among groups with low. Weintraub and Salley (125), reporting on withdrawals for poor scholarship from Hunter College, found only a moderate difference between those in the upper versus the lower half of the distribution of intelligence test scores: 24 percent of those from the lower half had been dropped, and 14 percent of those from the upper. It should be remarked that the girls at Hunter were highly selected before entrance; but the selection was not made by the intelligence test in question. MacPhail and Bernard (76) reported on the use of the Brown University Psychological Examination for ten years in four hospital training schools in Rhode Island, involving 1500 cases. In only two of the four

schools was there a reliable difference between the average scores of those who graduated and those who did not; correlation between intelligence test scores and training school grades ranged from .42 to .60; those accepted for training averaged just higher than high-school senior girls and much lower than liberal arts freshman girls.

Traxler (117) found that over a ten-year period, freshmen at teachers colleges using the American Council Psychological Examination averaged the same as junior college freshmen and the equivalent of only 3.8 IQ points lower than freshmen in four-year liberal arts colleges.

Constancy of Intelligence Ratings

Allen (3) found a correlation of .69 between Kuhlmann-Anderson IQ's of 327 children who took the test as a group midway thru grade one and at the beginning of grade four. Townsend (114) reported correlations for the same measures as follows: between grades one and four, .65; between grades three and six, .70.

Knezevich (64) reported IQ changes of more than 5 points for 56 of 113 Wisconsin high-school pupils who took the Henmon-Nelson Intelligence Test in sophomore and senior years. He concluded that the changes were attributable to the unreliability of the test and to error in estimating the age for cessation of mental growth.

Hirt (58) investigated retest IQ's based on the 1916 Stanford-Binet Scale in 1357 cases referred for examination in a large school system. Using Terman's seven categories, she found in this generally inferior selection that IQ's remained static in 62 percent of the cases, declined in 33 percent, rose in only 5 percent. Hildreth (56) found that average retest scores of superior children (Stanford-Binet IQ's of 130 or higher) ran higher than their initial scores and concluded that this made it unwise to rely on a single IQ obtained before a child is ten in assigning pupils to special classes for the gifted.

Taken together, these studies constitute confirmation of findings previously known. Two trends are underlined. The reports of Allen, Townsend, and Knezevich reflect the fact that ordinary variations in IQ values under normal conditions and without introduction of special experimental factors include substantial numbers of changes from one testing to another of ten or more IQ points. The studies of Hirt and Hildreth, in which low IQ's tended to drop and high IQ's tended to rise may be interpreted, as a reflection on the concept of a constant IQ, on the standardization of the 1916 Stanford-Binet Test, or both.

For discussion of experimental factors influencing IQ constancy, the reader should read also the section on "Environmental Factors."

Growth of Intelligence

Jones and Conrad (62) provided a convenient summary and synthesis of findings on the growth of general intelligence; this report is limited

to ages eleven to twenty. Conrad, Freeman, and Jones (21) reviewed the literature on differences in the growth of general intelligence among bright vs. dull, and among early-maturing vs. late-maturing children; characteristics of the growth curves of different mental functions were also presented.

Environmental Factors

Sherman's recent textbook (100) includes a convenient thirty-page chapter covering the literature, prior to this triennium, on the ethnic, cultural, and educational factors affecting intelligence and its constancy of development. The article by Loevinger (69) presents a critique of quantitative studies of the proportional contribution of differences in nature and nurture to differences in intelligence; Loevinger's discussion of statistical technic is especially recommended.

Schooling—Wellman (126) summarized research on IQ-changes of preschool and non-preschool children during preschool years, reporting that eleven of twenty-two preschool groups studied with the Stanford-Binet had average gains of six IQ points or more ($N=1537$), while only two of fourteen non-preschool groups showed similar gains ($N=597$). Similar results were found for groups tested with the Merrill-Palmer Scale. Iowa results differed little from those of other studies with Stanford-Binet Scales.

Wellman and Pegram (127) reanalyzed, with analysis of variance technics, the data originally published in 1938 by Wellman and others on the effect of orphanage environment and preschool attendance. They concluded that thirteen children with attendance in preschool on more than 50 percent of the calendar days of their more than 400 days of preschool life, showed reliably higher IQ gains than the twenty-one in the control group of children who did not attend nursery school. A sharp critic of the original presentation, McNemar (83), analyzed Wellman and Pegram's reanalysis of the data and, tho still critical, accepted as statistically sound their conclusion that preschool environment produced gains in IQ.

Bradway (9, 10) retested after a lapse of ten years 138 children originally tested with the 1937 Revision of the Stanford-Binet Scale when they were between two and five and one-half years of age. She found IQ changes of fifteen points or more in over one-fourth of the cases; approximately equal numbers, 24 and 26, had reliably higher and reliably lower IQ's on retest. From data secured thru home interviews she concluded that the chief correlate of IQ-changes was not environment, but intelligence of parents and grandfathers. Bradway (11) also reported a special study, based on the same cases, of the preschool items of the Stanford-Binet, which she subdivided into four scales; verbal, nonverbal, memory, and number-concept—and correlated with IQ's obtained ten years later. She found correlations of .45 to .62 and concluded that the verbal and memory scales were the better predictors of later IQ. In view of current

factor theories of intelligence, it would be desirable for further study of correlations of preschool part scales with part scales ten years later.

Lorge (72) reported a study of intelligence test scores of 131 men age thirty-four who constituted a representative sample of 863 boys tested twenty years earlier at age fourteen. He showed with detailed tables the tendency for those who completed more grades in school to have reliably higher retest intelligence scores than others who were roughly matched with them in IQ when initially tested. Garrett (37) criticized Lorge's article for roughness of equating, small size of sample and "misuse" of the term IQ, which appears in Garrett's argument to be constant by definition. In making these criticisms, however, he ignored a basic criticism of Lorge's conclusion, recognized by Lorge, namely that "grades completed" does not measure simply *amount of additional schooling*, but *amount of additional schooling resulting in promotion* at a time when promotion meant higher educational achievement. Granted that those promoted several grades did better on retest, what would have been true if those not promoted had been promoted and given more schooling? Would they, too, have gained by more schooling?

Wesman (128, 129) explored "the comparative contributions of several of the more popular high-school subjects to mental growth as measured by ability to score on an intelligence test." He found that the gains in achievement in separate subjects at the high-school level showed little correlation with gains in intelligence test scores for the same period. He also found lower correlations between achievement in particular subjects and scores on intelligence tests taken after studying the subjects than the corresponding correlations between achievement and scores on intelligence tests taken before studying the subjects. He explained both findings as due to the fact that "higher levels in a subject are more specific to it than are lower levels." In keeping with his environmentalistic thesis he concluded that his study "indicates the desirability of direct training in mental processes rather than dependence on transfer from school subjects."

Schmidt (99) analyzed the needs of 254 boys and girls, twelve to fourteen years old, all of whom had been originally classified as feeble-minded, mean IQ = 51.7. On the basis of this analysis of physical health, mental abilities, academic achievement, behavior patterns, family, educational and community backgrounds, an experimental educational program was set up for these adolescents that was characterized by group planning, group experiences, inschool reproduction of situational experiences, and use of creative and manipulative arts. After three years, the pupils averaged 4.1 years gain in educational achievement. After eight years, 27 percent completed four years of high school, the experimental group had average adult intelligence, while a control group had dropped an average of 3.6 IQ points. This degree of improvement is striking and worthy of critical evaluation which has not yet appeared.

Factors related to the home—Brown (13) reported that 1000 cases he had tested at age six with the 1937 Revision of the Stanford-Binet Scale showed the same narrow dispersion reported by Terman and Merrill in their standardization studies. Brown interpreted these findings as reflecting the dominant influence of the home up to age six, exerting pressure toward conformity.

Patterson (89) reanalyzed data previously reported by Wallin on the fluctuations of IQ of two siblings tested over twenty-five times in a fourteen-year period and found greater parallelism in the curves when results were plotted for the same calendar years, when the siblings were four years different in age, than when plotted for the same chronological ages of the two children. He concluded that environmental influences affecting the family as a whole may have produced this concomitant tendency.

McHugh (80) gave the Goodenough Draw-a-Man Test to eighty-three of the ninety-one kindergarten children on whose Stanford-Binet Test results he had reported earlier, with a view to exploring the hypothesis that pupils who gained in MA and IQ on the Stanford-Binet Test because of speech development over the two months between testings, would not show similar gains in a nonverbal test of intelligence. Reliable gains in Goodenough MA and IQ were found, which correlated only .16 and .17, respectively, with Stanford-Binet gains in MA and IQ, but —.36 and —.44 with Barr Occupation Ratings for fathers, and —.30 and —.34 with education of father. Because these negative correlations reflect greater gains by those with fathers of low occupational and educational status, it was suggested that advantages associated with drawing at home left children of favored parents less to gain from kindergarten in drawing. Darcy (28) in a study of 212 children of preschool age found in all sub-groups with respect to age and sex that the bilinguals were inferior on the 1937 Stanford-Binet and superior on the Atkins Object-Fitting Test. Her study suggests the desirability of exploring the possibility that the differences represent outcomes of psychological compensation.

Livesay (68), studying 1383 high-school seniors in Hawaii, found the usual relationship between mental test scores and economic status. Economic status seems further to be related to order of arrival of immigrant groups, as in continental United States history.

Skodak and Skeels (102) rendered an extensive follow-up report of 139 children of parents of low intellectual, educational, and occupational status who were placed in foster homes at an average age of three months. They found the mean IQ had moved from 116 at average testing age of two years three months, to 112 at four years four months, and now 113 at seven years one month.

Ethnic groups—Havighurst and Hilkevitch (52) gave the Arthur Performance Test to 670 Indian children, age six to eleven, of six tribes. The Hopi Indians were superior to the norms based on white children, while most of the other groups were approximately at the norms. Con-

trary to expectation, the Indian children worked just as rapidly as white children on the test. It would appear that performance tests are more appropriate to testing intelligence of these Indian children for guidance purposes than are verbal intelligence tests. Havighurst and others (51) administered the Goodenough Draw-a-Man Test to a representative group of over 300 of the Indian children previously tested with the Arthur Performance Test. Most of the Indians did better than white children on the Draw-a-Man Test. The difference is attributed largely to the fact that "the Indian children, and especially the boys, are stimulated to take an active interest in the world of nature, and given much opportunity to form and express concepts of natural objects, including the human body, on the basis of their own observation."

No reliable difference in mean score on the 1916 Stanford-Binet Test was found by Brown (12) in his well-designed study of 323 second-generation Scandinavian and 324 second-generation Jewish children. The Jewish surpassed the Scandinavian on certain test items, and vice versa. Cultural-experiential factors are invoked to explain these differences.

Applying the discriminant function technic to results from the Bellevue-Wechsler Adult Intelligence Scale, Machover (75) concluded that "the subtest pattern of culturally very restricted southern Negroes runs counter to expectations based on the assumption that performance tests are less culture-bound than abstract verbal tests." Tomlinson (113) studied seventy-five sibling pairs of Negro children in Austin, Texas, each of whom had been given both forms of the revised Stanford-Binet in close succession. Mean IQ for the younger siblings of the pairs was 92.5, for the older 86.7, indicating a reliable difference ascribed to cumulative environmental effects. Children from better homes, as rated by the Sims Socio-Economic Scale, had higher scores in both groups.

McGurk (79) reported the usual reliable differences in favor of whites over Negroes in southern cities. He went on to propose as a clinically sounder basis for evaluating mental deficiency, the development of local norms for Negroes in places where they are segregated and underprivileged.

Klugman (63) found a small but not statistically reliable superiority of money over praise as incentive among seventy-two children in grades two to seven who took both forms of the 1937 Revised Stanford-Binet Test. Between the thirty-eight white children and the thirty-four Negro children there was no difference under money incentive, but when praise was the incentive, the white children made equally good scores while the Negro children were on the average three IQ points lower.

Montagu (84) compiled and compared data on the achievement of northern Negroes and southern whites on intelligence tests used in World War I, and summarized the results in thirteen tables and ten maps as a graphic illustration of his thesis that factors other than race, chiefly socio-economic, account for many of the differences found, since many

of the differences favor Negroes. Montagu (85) also presented his data in a polemic volume. Garrett (35) presented a bill of exceptions to Montagu's earlier article. Most serious of his criticisms of Montagu's research is the fact that the sampling of draftees assigned for Alpha and Beta Tests differed from one examining center to another.

Garrett (36) also climaxed an extended discussion among biologists, anthropologists, psychologists, and semanticists on the question of race differences by analyzing some of the data offered by opponents of a concept of race differences. The complete series of communications, which can be traced back thru several months' issues of *Science*, will reward the careful reader with a summary of the factors affecting "race differences" that need to be understood in connection with the facts and their interpretations in current living.

Biological Factors

Cook (22) summarized the findings of medico-psychological research on the effects of the *Rh* blood-factor in producing feeble-mindedness. Approximately 11 percent of all marriages involve incompatibility between husband and wife with respect to this factor, whence in births after the first the probability of feeble-mindedness in offspring is substantial. References to basic research were given.

Gardner and Newman (34) described the fifth of a series of quadruplets. This set is unique, being monozygotic. Altho almost identical in attributes, as in heredity, differences in their Stanford-Binet mental ages, Army Beta mental ages, and Stanford Achievement Test sub-scores at ten years three months correspond remarkably to differences in height, weight, and other skeletal measures within the set. It was pointed out that this is in agreement with findings of the famous Dionne quintuplets.

Using a sample of 613 students (men and women), Gaskill and Fritz (38) determined conclusively that intelligence at the college level is unrelated to basal metabolic rate. Pathological cases were not included.

Guetzkow and Brozek (46) studied the effect of extended vitamin B-Complex deprivation on eight normal young men. They found no drop in intelligence test scores during 161 days of restricted diet. Reliable decline was observed on the mental tests most dependent on speed during twenty-three days following, when they were totally deprived of these vitamins, but this was righted by a ten-day period of full vitamin supply. "As compared with biochemical, physiological, and other psychological aspects of fitness, the intellectual functions were among those which proved to be most resistant to the imposed dietary stress."

Exceptional Groups

Aurally and visually handicapped—Myklebust and Burchard (87) gave the Arthur Performance Scale to 121 congenitally and 68 adventitiously deaf children of school age at a state institution for the deaf. They found

no reliable differences between these two groups. Boys did better than girls, the difference being reliable at the 5 percent level, thus confirming previous findings. Capwell (14) described the problems and values in applying intelligence tests in a school for the deaf, in particular demonstrating the useful part of a performance test (Arthur) played in a total program of educational and vocational guidance.

Hayes (54) described and discussed his Interim Hayes-Binet Intelligence Tests for the Blind, 1942 revision, which follows the 1937 Revision of the Stanford-Binet.

Delinquents—Ludden (74) and Kvaraceus (67) found in separate studies that low IQ is a factor predisposing to delinquency, but is only one of several such factors. Ludden proposed a critical total of three or more out of ten predisposing factors, including IQ below 90, as a practical index of potential delinquency.

Porteus (93), extending his earlier studies, confirmed his original finding that qualitative scoring of his Maze Test establishes reliable differences in favor of nondelinquents. Differences between behavior problem children and others, between satisfactory and unsatisfactory cannery workers, were favorable to the socially approved groups.

Mental disorders—For studies on the use of ability tests in the differential diagnosis of mental disorders, see Chapter VIII.

Miscellaneous

Adult groups—Thorndike and Gallup (109) described the standardization of two twenty-item vocabulary tests in the course of a routine opinion poll. Among others, one interesting finding is that voters (for either Roosevelt or Willkie in 1940) made reliably higher scores than those who neglected their right of franchise.

Sward (108) administered a battery of eight difficult intellectual tests to forty-four professors, age sixty to eighty, and forty-four faculty members, age twenty-five to thirty-five, drawn from the same two institutions. In general, the younger men outscored the older. Individual differences were more impressive than mean differences between the two age-groups. No change of any significance was detected within the ages sixty to eighty. The results were considered largely a by-product of disuse or an artifact of the particular tests employed. The writer seems to have leaned over backward in his summary and interpretations to soften the blow for those of us past thirty-five.

In a suggestive study, Cleveland and Dysinger (19) found, in 20 senile psychotics, that they could respond to the abstractions in the verbal items of the Bellevue Adult Intelligence Scale, but were unable to sort objects satisfactorily on an abstract basis. How deep and broad is the meaning of verbalized relationships?

Administrators—Mandel and Adkins (77) administered the American Council on Education Psychological Examination (linguistic or verbal

section only) to several groups of federal administrators. For twenty individuals in the top management group, the correlation between the verbal section and the criterion of over-all performance was .64. Favorable results were also obtained with other groups of administrators.

Sex difference—Rabin and Weinik (96) gave the Nebraska revision of the Army Alpha Examination to ninety student nurses; their scores on factor *N* (number) were notably low. The authors consider this a sex difference, rather than an occupational characteristic.

Interrelations—Cattell (15, 16, 17) conceived and executed an elaborate exploratory study of personality traits associated with possession of general intelligence, drawing ability, and mathematical and verbal ability at the high achievement levels represented in the Graduate Record Examinations. Starting from the assumption that group factors found in factor analyses of ability tests may simply be symptomatic of environmental and intrapersonal interests directing persons of given levels of general intelligence to specialize in particular abilities, he cast up a preliminary framework of thirty-five trait characters, whose rated occurrence in 208 male adults was factorially analyzed into twelve principal components, as a background against which to study relations with intelligence and the specific abilities. From this analysis he concluded that intelligence test achievement is well identified as a general factor of effective habits of thought and work, with relations to emotional stability and integration; verbal and mathematical ability at high levels is related to general intelligence and its associated personality factors, to character maturity and to extensive educational background; verbal ability is also possibly related to lack of sociability, resulting in a preference of books over people, and to a more sensitive, less masculine personality resulting in the type of superiority with words characteristic of the feminine; mathematical ability is associated with low dominance. This type of research, by its nature, verges on the spurious because of the dependence on armchair speculation and interpretations, but it offers promise of producing insights into total personality organization not obtained thru more controlled research approaches.

Evaluation by experts—Kornhauser (65) reported in great detail a questionnaire study of the opinions of seventy-nine "experts" on values and trends in intelligence testing. A substantial majority, fifty-five, favored future emphasis on separate factors as distinguished from general intelligence. Almost all (92 percent) agreed that there is a serious public misunderstanding of the values and limitations of intelligence tests.

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CHAPTER III

Measurement and Prediction of Special Abilities

HAROLD D. CARTER

LIKE the other chapters in this issue, the present review cannot pretend to be exhaustive; if only because of lack of space, it must be selective. Official military and naval staff publications have not been included, since these will be covered in a later issue of this REVIEW. The literature in some fields, for example reading, is so voluminous that it must be reserved for special treatment, altho a few contributions exemplifying the recent analytic trend are reported.

Trends

A number of trends seem to be revealed in recent research. One is a marked emphasis upon analysis of intellectual abilities into special components. There is renewed concern with methods of recording, analyzing, and interpreting data from batteries of special abilities tests (11, 138, 142). The war has had the effect of stimulating research upon visual and auditory perception, mechanical and other special abilities, and various aspects of achievement (38). There is continued interest in factor analysis as a method of isolating special abilities (28, 46, 138, 139). The relationships between special abilities and interests continue to receive attention (78). Variations from ordinary pencil and paper technics in testing include the use of subjective judgments and increased use of apparatus (151). Practices in the army and navy (29) suggest, as do other lines of evidence, that strict lines of demarcation between tests of general ability, special ability, achievement, and personality cannot be maintained. The modern trend is away from emphasis upon verbal tests, away from age scales, and toward the use of group tests of the point-scale type (83).

These trends do not seem particularly new; they have had their antecedents, and they now appear as the natural flowering of a long period of development in psychometrics. However, these tendencies may be regarded as a noteworthy aspect of research in 1943-46.

Criteria

Criteria for the definition of special abilities have usually included evidence regarding reliability and validity of measurement, as well as independence from "general intelligence." The use of factor analysis in the identification of special abilities amounts in some instances to the substitution of other criteria. An example of research by the new method is the study by Thurstone (138), who applied factoring methods to the study of a battery of perceptual tests and tests of primary mental abilities. He found eleven perceptual factors, which turned out to be essentially

uncorrelated. Some of the factors seem to hold promise as measures of particular academic abilities.

Burt (20) has indicated the desirability of distinguishing between abilities and "mental factors." His report includes a discussion of basic scientific procedures of measurement, which include the taking of sums or averages to achieve reliability and rule out trivia, and the taking of differences to isolate that which is independent of other measures.

A study of Reichard (108) calls attention to the importance of the subjects' age and certain technical features of test make-up in the isolation of special abilities. Reichard's battery of eight tests included three of verbal abilities, two of number abilities, two of memory, and one of spatial relationships. The degree of intercorrelation increased from age nine to age twelve, and decreased from age twelve to age fifteen.

Several studies, for example Kirkpatrick's (75), have called attention to the implications of definitions of aptitude and skill, and have stimulated reconsideration of terminology, especially when viewed along with the concept of aptitude tests of the so-called readiness type. Discussions like those of Davis (30), Cockett (24), and Blain (14) are significant for those primarily interested in incorporating programs of special ability testing into the framework of educational and social guidance. The article by Scates (112) described "differences between measurement criteria of pure scientists and of classroom teachers."

Academic Abilities

Perhaps group mental tests of the commonly-used verbal types are properly regarded as measures of a special ability for academic work. Studies such as those by Crawford and Burnham (25) have given extensive consideration to the prediction of academic success, at the college level. In predicting educational success in general, various measures of special verbal abilities are still emphasized (47, 101). In a more specialized study, Berg, Johnson, and Larsen (12) have shown that tests in the mechanics of expression are valid in prediction of grades in rhetoric.

Studies of the use of previous records in the prediction of college success are largely outside the scope of this review. When they include more specialized tests, such studies (123) tend to indicate that total previous record predicts better than do the special tests. When educational achievement is objectively measured, tests predict it better than when achievement is estimated in terms of more subjective criteria. Durlfänger's review (35) showed that mental tests predict college success better in recent years, while achievement tests showed higher correlations with college success in earlier investigations. The report by Douglass (33) suggested the need for more specialized measures in prediction, inasmuch as the abilities required for success in various curriculums are often quite different.

Academic abilities are somewhat specialized; the modern trend is

toward analyzing them into their specialized components. A small subsection of the literature on reading, for example, shows a tendency to analyze reading abilities into a large number of highly special and largely independent abilities. Similarly, in other fields there is evidence of interest in detailed and diagnostic measurement. Brody (19) has shown that spelling tests in different forms measure independent abilities. Simpson (120) has indicated that a group factor might be measured by means of a battery of spelling tests. Studies by Stroud (130) and by Hall and Robinson (53) have shown that reading skills can be analyzed into a considerable number of independent sub-skills. Davis (28) applied the method of principal axes in the factor analysis of a battery of reading tests. Thurstone (139) reanalyzed the data, finding that the centroid method revealed only one factor of importance. To the present reviewer, it seems that the finding reported here has more general implications. Some of the most popular reading test batteries imply by their detailed analysis charts that the tests measure several highly-specialized abilities. However, from the processes used in the subtests it seems quite unreasonable to suppose that the typical modern reading test battery yields *reliable* measurement of very many factors.

So far as this review is concerned, the interest here is not in the measurement of achievement, but in those aspects of the studies concerned with the analysis of academic abilities into components which can be measured and predicted by psychological tests. There is obviously here no clear-cut division between tests of achievement as such and tests of specialized abilities.

Davis and Henrick (31) have shown that a special test is effective in predicting ability in geometry. Goddeyne and Nemzek (45) found the Lee Test of Geometric Ability more effective than other measures for predicting ability in geometry. Guiler (52) secured a very high validity coefficient, .78, for the Iowa Algebra Aptitude Test.

Wittenborn and Larsen (149) showed that a special linguistic ability test is more effective than other measures in the prediction of achievement in college German.

Numerous studies (4, 7, 68, 72) imply the existence of a special ability which might be called critical thinking ability. The analytic technics relating to test reliability, test validity, independence from general intelligence, and independence from other previously established measures should be applied here with special care. Since the existence of special abilities for critical thinking is so frequently implied by the naming of tests and the development of programs of instruction, it seems desirable to call for a program of research to reveal the nature of the abilities more clearly. Perhaps variance in scores on tests of "critical thinking" is largely explainable in terms of intelligence, special reading skills, and special categories of factual information; very likely factors of attitude and motivation are also involved.

Scientific Aptitude

Edgerton and Britt (36) have described procedures used in a comprehensive search for science talent. Hoffman (65) has criticized the method, objecting mainly to the use of the successive-hurdles method and to the use of criteria which emphasize mathematical ability and social competence. He seems to feel that more emphasis should be given to abilities involved in such fields as botany, horticulture, ornithology, astronomy, and genetics. The second article by Edgerton and Britt (37) was offered in rebuttal.

Available tests for the measurement of aptitudes for scientific work tend to include measures of mathematical abilities, quantitative thinking, and special categories of information. No doubt more tests should be constructed, in greater variety, and studies should be undertaken to determine their validity in the prediction of abilities for different types of scientific work.

Howard's monograph (67) dealt with the complexity of mental processes to be tapped in science testing. Judges showed very good agreement in rating items as requiring memorization versus complex integration of information. Student judgment, but not expert judgment, was markedly influenced by item difficulty. Factor analysis indicated that the test of scientific ability used in the study measures three factors, namely: science achievement, an intellectual factor, and a complexity factor.

Aptitudes for Professional Work

1. *Engineering*—Several studies (15, 43, 50, 82) have dealt with the use of tests in predicting success in engineering training courses. Frandsen and Hadley (43) found tests of mathematics and of electrical information more effective than tests of general intelligence for prediction of success in a radio training school. Bolanovich (15) found tests of personality, of achievement in mathematics, and of general fitness had moderately high validity for prediction of success of female engineering trainees. Lawshe and Mills (82) found that tests of school achievement, of mechanical ability, and of knowledge in special fields were valid and efficient for prediction of success in training courses in electricity in the Navy. The tests measured ability to read simple measurements and to solve simple arithmetical problems, knowledge of practical electrical information, and mental alertness. A multiple correlation of .82 indicated the validity of the tests for prediction of achievement in the training courses.

Griffin and Borow (50) have announced a new test of aptitude for engineering and physical science. The test includes sections dealing with mathematics and arithmetic, mechanical comprehension, and verbal comprehension. Multiple correlations for validity as indicated by course achievement were as high as .79. The test is valid for both women and men, altho separate norms are necessary.

Andrews (5) used a battery of tests of manual dexterities and intelli-

gence in selecting workers in engineering jobs, finding that the tests are valid and efficient, but that interview ratings add to the efficiency of selection. Shuman (119) has shown that tests of intelligence, mechanical ability, and mechanical comprehension are valid for discriminating between effective and unsatisfactory workers in aircraft engine and propeller industries. Holliday (66) studied the use of psychological tests in engineering industries; over a period of four and one-half years, the skills of apprentices approached cumulatively nearer to the levels predicted by tests of intelligence and mechanical aptitudes. In the beginning the tests of intelligence were more effective in prediction, but later on the special ability tests were more effective. This study by Holliday offers stimulating suggestions concerning dynamic aspects of prediction.

2. *Music and art*—Gilkinson (44) found that musical or auditory abilities as measured by the Seashore Tests have little relationship to speech skills. This study checks on an hypothesis which seems deserving of persistent additional examination, in view of present knowledge concerning the speech of the deaf.

New tests of musical abilities, covering time discrimination, melodic and harmonic transposition, and melodic and harmonic sequences, have been announced by Lundin (88). After statistical analysis, the author concluded that the tests measure important aspects of musical temperament and ability. Dunlevy (34) found that tests of musical talent are valid for prediction of preferences and achievements in various types of musical training.

Barrett (9) applied a battery of tests of interests, mechanical ability, and art judgment, to students in a liberal arts college. She was able to show that the tests could be used in combination to measure suitability for entrance into an art curriculum.

3. *Law*—Adams (1) has reported high validity coefficients for the Iowa Legal Aptitude Test, which includes tests of verbal ability, information, comprehension, and reasoning. The correlations with first-year law achievement ranged from .48 to .76. The highest multiple correlation found was .77.

4. *Medical and dental aptitudes*—In a discussion of the criteria for selection of medical students, Turner (147) has pointed out that aptitude tests, plus a good record in premedical work, plus evidence from essay-type exercises, furnish the best basis for admission to medical schools.

Smith (125) has published a long article on testing of aptitudes for dentistry. The most effective methods involve use of tests of scholastic aptitude, mechanical and manual abilities, and vocational interests. Smith reports that the most reliable predictions make use of predental records as well as of test results.

5. *Nursing*—Potts (106) found that a battery of tests of general and special vocabulary, and of mechanical and educational abilities, had considerable validity in prediction of aptitude for nursing. No personality

type for nurses was indicated. Crider (26) reported that tests of intelligence and of reading and arithmetic are valid, but that tests of adjustment and of interests contribute little in predicting success in a curriculum for nurses. These studies, like those in the medical and legal fields, indicate that the criterion is best predicted mainly by academic abilities, so long as the particular curriculum is enforced.

6. *Teaching*—A study by Seagoe (115) indicated that tests of scholastic aptitude in general, and of special achievements, as well as of personality, are useful in the pretraining selection of teachers. Candidates for teacher-training seem to be definitely superior in verbal abilities, in quantitative thinking, and in knowledge of contemporary affairs, as well as in manual and musical abilities. Seagoe's second study (116) indicated that tests of personality such as the Bell Adjustment Inventory, the Bernreuter Personality Inventory, etc., are significant in the prediction of teaching success. The Morris Trait Index and the Coxe-Orleans Prognosis Test were also valid, but measures of intelligence and of special abilities were not useful. Tests of interests and of attitudes were also found ineffective. The negative results are interpreted as possibly due to the highly selected nature of the group of candidates for teaching.

Numerous studies have dealt with aspects of pupil achievement as criteria of teaching effectiveness. These studies constitute basic research upon the criteria which must be involved in the development of any effective tests of aptitude for teaching. According to Rostker (110), intelligence is the major factor in teaching efficiency as measured by pupil progress, while personality of teachers is unimportant, and teachers' social attitudes are of intermediate significance. Rolfe's findings (109) appear inconsistent with those of Rostker, while LaDuke's investigation (80) supported Rostker's to the extent of indicating the importance of intelligence as a factor in teaching effectiveness.

McCoard (89) found that scores for speech factors are correlated to the extent of .45 with teaching effectiveness as measured by pupil gains. McCoard's study is stimulating, suggesting as it does the use of a new and specialized and objective technic for prediction of teaching success.

Several studies have considered various aspects of teacher rating. A factor analysis by Smalzried and Remmers (122) indicated that student ratings of faculty members measure two factors, namely: an empathy factor emphasizing sympathy and fairness, and a professional maturity factor emphasizing self-reliance, confidence, and ability in the presentation of subjectmatter. Dodge (32) studied personality traits of effective and ineffective teachers, using a self-rating technic. He found that the more successful teachers rate themselves as more at ease socially, more willing to assume responsibility, more sensitive to the opinions of others, less willing to hurry in making decisions, and less subject to fears and worries than the less successful teachers. Gotham's study (49) showed that various indicators of personality of teachers are valid as judged against teacher-rating criteria, but not valid by the criterion of pupil gains. These

studies are here regarded as significant contributions to the development of tests for teaching abilities. They clarify the criteria against which such tests are judged, and they indicate the content of subtests for batteries of tests to be used in measuring special abilities for teaching.

A factor analysis of teacher abilities, undertaken by Hellfritzsche (63), showed that various tests and other indicators of teachers' abilities measure four factors, namely: general knowledge and mental ability; a teacher rating scale factor; a measure of personal, emotional, and social adjustment; and a favorable attitude toward the teaching profession. Practically all the variance in pupil gains could be accounted for by pupil factors and teacher factors. One receives the impression that teaching ability is a loosely-organized complex of four types of variables.

A somewhat different type of research is that by Anderson and Brewer (3), who developed a reliable observational technic for measuring dominative and socially integrative behavior in the classroom. The study clearly suggests the desirability of further research using a new criterion of effective teaching. A somewhat similar type of study was done at the nursery school level by Landreth and others (81). It is to be hoped that the ideas involved in these studies can be assimilated and used in a program of objective testing of special abilities needed in effective teaching.

Visual Acuity

In testing visual acuities, the trend has been toward recognition of the complexity of common visual work, and toward detailed measurement of its varied aspects. Brandt (18) has devised an instrument which records on 35 mm. film the location, duration, and sequence of eye fixations, and the distance and direction of all movements. Limitations of the common test chart for measuring visual acuity have been pointed out by Luckiesh (86), who noted the effects of brightness levels and contrast effects upon such measurement. Low (85) described a technic of measuring peripheral visual acuity. He found it extremely variable, somewhat subject to training, and relatively independent of other visual functions. Sherman (118) reported that training in drawing and painting improves peripheral acuity as measured, and affects certain other visual abilities, but does not improve central acuity.

Several studies have taken account of visual defects as factors in school achievement. Park and Burri (100) indicated that a summed score for eye defects was somewhat negatively correlated with reading level among pupils in elementary school. A visual test survey of 5000 school children, reported by Dalton (27), indicated that about five out of six elementary-school children have some visual defects, that many variables measured are unrelated to school achievement in general or in the special field of reading. In summary, one might say that many visual abilities are not valid indicators of educational achievement, but they have their importance in the field of health in general, and the field of visual well-being in particular.

Color Vision

Age and sex differences in color discrimination have been discussed by Smith (124), whose findings suggest that differences found in color-matching tests may be in part due to experience, and only partly determined by native capacities and maturation. Pickford (102) found that women who are blood-relatives of color-blind persons have red-green weakness much more frequently than other women. Chapanis (23) reported that the saturation of the spectrum is reduced for persons with certain color deficiencies, but that they can equate brightnesses more easily than normal subjects can. Murray (96) has reviewed the development of color-vision tests.

Recently there has been much criticism of the Ishihara Test. Pickford (103) found it inadequate for discrimination of degrees of color blindness. Hamilton, Briggs, and Butler (54) found that it fails under certain circumstances to discriminate between responses of normal and color-blind persons. Harris (59) reported that the Ishihara plates are better than those of the American Optical Company. Taylor (133) used the hues of negative after-images matched against Munsell color chips as a criterion, and found the Ishihara Test inadequate. Hardy, Rand, and Rittler (56) found some of the Ishihara plates relatively useless, and reported that the test is markedly affected by the conditions of illumination under which it is used. They consider it a crude screening device, likely to give deceptive results.

In a study of age differences in color discrimination, Smith (124) used a matching method, with Munsell materials. The ability to discriminate increased rapidly up to age twenty-five, and dropped markedly after age sixty-four. Females were superior between ages five and eleven, and males superior after age fourteen.

New methods for measuring color-vision differences have been announced by Sloan (121) and by Hardy (55). The technics most commonly employed involved matching, judging, and reporting of facts concerning after-images. The newer technics not only involved these devices, but also present modifications and improvements in method and in the use of auxiliary aids.

Auditory Testing

The war has stimulated many studies of aircraft-operating personnel, among whom an auditory deficiency has been found at about 4096 cycles per second. This deficiency has commonly been attributed to aircraft noise, gunfire, etc. Senturia (117) tested aircraft personnel prior to exposure to traumatic stimuli, and found the well-known deficiency at about 4096 cycles per second in about 19 percent of the persons tested. High-frequency deafness has commonly been reported in war studies. Plummer (105) has given special attention to high-frequency deafness and the discrimination of speech sounds in high-frequency

ranges. It is significant for the validity of hearing tests that he found that discrimination of consonants depends extensively upon discrimination in the more fundamental frequencies. Hearing aids are ordinarily considered helpful only in cases of rather severe losses in hearing in the speech ranges of tonal frequencies.

Numerous studies have dealt with audiometric tests and their use. Osborn (99) reported a study in which tests were taken twice on 248 children, with a year's interval between tests. Those who had received medical treatment showed improvement in 85 percent of cases, as compared with 23 percent for the group not having medical aid. Hughson and Thompson (69) reported that fairly accurate tests can be made of children two years of age and older. Templin (135) considered the effect of psychological factors on measurement of sound discrimination of elementary-school pupils, and also reported evidence that a brief series of sound stimuli is valid as judged against a longer series. Fowler (42) pointed out the importance of psychological variables such as memory, auditory perceptual skill, and interpretative skill, in clinical diagnosis of hearing deficiencies.

Several technical problems have been attacked. Carter (22) has attempted to work out a method of presenting hearing losses in terms of a single index or figure. His study suggests interesting possibilities for research on the optimum weighting of scores for hearing in different tonal frequency ranges, for the prediction of significant clinical losses in hearing. Harris (58) described the apparatus used in group audiometric testing, and showed that the reliability of results compared favorably with that of the usual individual testing method. Goldman (48) presented a comparative study of whisper tests and audiograms, showing that the relationship between the two appears not to be simple or constant, and is dependent upon parallel hearing losses in both ears. Technical problems in testing with commercially available audiometers have been discussed by Grossman and Malloy (51).

Mechanical and Manual Abilities

Research has continued to provide data which increase the usefulness of available tests. For example, Tuckman (146) has provided norms for special groups, males and females, for the Minnesota Rate of Manipulation Tests, and has studied the relationship of scores with age and intelligence. Stephens (129) has contributed norms for the Minnesota Paper Form Board Test. More norms for the Minnesota Paper Form Board Test have been presented by Baldwin and Smith (8), and by Morgan (94, 95), who found the test not very useful under certain conditions for prediction of ability in a technical-industrial high school.

Analysis of the abilities measured by the tests is the problem of several investigations. Tinker (141) showed that while speed, level, and power scores on the Minnesota Paper Form Board Test vary somewhat independently among college students, nevertheless power scores are largely

accounted for by speed scores, and somewhat by level scores. Rusmore (111) found no significant sex differences in scores on the Crawford Test of Tridimensional Structural Visualization applied to college students. Low correlations between successive trials suggest that the function measured by the test changes with practice. Tuckman (145) found little overlap between the Minnesota Paper Form Board and the O'Rourke Mechanical Aptitude Tests. Traxler (143) found that the Minnesota Paper Form Board and the Bennett Mechanical Comprehension Tests correlated with group intelligence tests about as much as with one another. Bates, Wallace, and Henderson (10) studied four mechanical ability tests, finding intercorrelations ranging from $-.01$ to $.52$. Men were superior to women on the spatial relations and mechanical aptitude tests, but no significant sex differences were found on the Minnesota Paper Form Board and the O'Connor Wiggly Block Tests. Steel, Balinsky, and Lang (127) found low correlations between the O'Rourke Ringing an Electric Bell worksample, and the O'Connor Tests of finger and tweezer dexterity, and the Minnesota Rate of Manipulation Tests. Significant sex differences in scores on the worksample were found.

Jones and Seashore (73) have reviewed findings in the development of fine motor and mechanical abilities, and have discussed the nature of tests of mechanical and motor abilities. Developmental studies show that girls are only slightly retarded during adolescence, as compared with boys. Most of the currently used tests in these areas measure spatial relations, manipulative speed, or efficiency in the assembling of small mechanisms. There is little evidence of the existence of broad factors, such as manual dexterity, in the field of mechanical abilities.

Several studies have concerned themselves with prediction of abilities in specialized curriculums. Morgan (95) used the MacQuarrie Test, the Minnesota Paper Form Board, and a revision of the Army Alpha Test in a study of pupils in grade eight in a technical-industrial high school. He found the tests useful in practical vocational guidance when used along with other information about the individuals guided. McDaniel and Reynolds (90) found that a battery of three tests, namely the Bennett, MacQuarrie, and O'Rourke Tests of mechanical abilities, yielded a multiple correlation of $.47$ with instructors' ratings of ability of high-school students in mechanical training courses.

The prediction of success in mechanical occupations has been another subject of investigation. An unusual approach is that of Piotrowski *et al.* (104) who found, by an item-analysis technic, that four different signs in the group Rorschach Test differentiated between good and poor workers, in a small sample of young male mechanical workers. These results need confirmation, however, since the investigators did not explore the results with a second sample. Jacobsen (71) used a battery of manual and mechanical ability tests to predict achievement in aircraft skills, finding multiple correlations ranging from $.42$ to $.61$ when only two tests were used. McMurtry and Johnson (91) presented evi-

dence of high validity of the Thurstone Identical Forms and the Bennett Mechanical Comprehension and the Minnesota Rate of Manipulation Tests, when used along with interviews, in the selection of mechanical workers. The Wonderlic Personnel Test and the Army Beta Test were not useful, but correlations with on-the-job ratings of employees ranged from .64 to .71 for the Thurstone and Bennett Tests.

Teegarden (134) investigated occupational differences in manipulative performance of applicants at a public employment office. Normative materials for the Kent-Shakow Test, and for spatial relations, placing, turning, and phler dexterity tests were presented in graphic and tabular form, for men in nine occupational groups and women in seven occupational groups. Such groups differed more in problem-solving ability, accuracy of movement, and ability to react to complex collections of details than in coordination and rate of manipulation.

Tests of Gross Motor Abilities

Individual differences in gross motor abilities have been investigated by Thompson (136), who tested all the boys in a junior high school in New Mexico. The tests used were the baseball throw for distance, base running, chinning, the sixty-yard dash, jump and reach, and shot-put. When the groups were equated for age, height, and weight, the Mexican boys were superior to the Anglo-American boys in all the tests, and significantly superior in five, the exception being the shot-put.

Numerous studies have been made of the usefulness of particular tests. Melton (92) showed that a rotary pursuit test, two coordination tests, and a discrimination reaction time test were valid in selection of army pilots. Bookwalter (16) obtained validity coefficients varying between .81 and .86 for four methods of measuring motor fitness. Schroeder (114) evaluated archery scores as predictive of individual persons' motor abilities, investigating the effects of practice and fatigue, and showing that the ordinary lesson in archery is too short to provide satisfactory measures. Hartman (60) studied the hurdle jump in relation to other motor tests on young children, finding the various tests sufficiently reliable, and indicating the need for several tests in order to secure adequate measurement of motor ability of young children.

Much more research is needed in this area. Numerous normative studies are needed, as well as analytic studies in the development of batteries of tests of general and of special abilities. It would be helpful if standardization could provide alternative teams of tests, and indicate their comparability. Socio-economic group differences, and the effects of training upon tested abilities are topics requiring further investigation.

Clerical Aptitudes and Abilities

A few studies have dealt with analysis of the complex of clerical abilities and their correlates. Thus Woody (150) investigated the O'Rourke Clerical Aptitude Test and a special mathematics examination as used

in the senior high school, showing differences in relation to age, sex, and size of school. Klugman (78) found no significant relationships between scores on the Blackstone Test of Stenographic Proficiency and permanence of clerical interests. Permanence of clerical interests seemed also independent of scores on tests of intelligence, and typing, and independent of age and school grade. In another study, Klugman (77) found significant gains in scores on the Minnesota clerical test and on the clerical interest scale of the Strong Vocational Interest Blank, when students were tested at the beginning and end of a year of commercial schooling.

Numerous studies have indicated the validity of particular tests. Oberheim (98) found validity coefficients of .66 for men and .54 for women, when the NIIP Clerical Test was used to predict proficiency in a library course. There were significant sex differences in the validity of individual tests in the battery. Lennon and Baxter (84) investigated a clerical employees checklist constructed by supervisors, finding it useful in predicting speed and understanding of the work, but not valid for predicting accuracy, nor the personal factors involved in success. Swem (132) showed that ability in homework in accounting was not closely related to scores on the Minnesota clerical test. Hay and Blakemore (62) applied the Minnesota clerical test to experienced and inexperienced applicants for clerical work, finding statistically reliable differences in favor of the experienced group. Little relationship was found between scores and experience beyond one year. The differences in scores of the two groups on the clerical test were not explainable in terms of age, intelligence, and school training; apparently the differences are due to differences in native abilities. In another study, Hay (61) obtained a validity coefficient of .70 for the Army Alpha Number Series Test (Nebraska revision), the Fryer Name Finding Test, and the Minnesota Numbers Test, when these were used to predict success in machine bookkeeping.

Driving

Any survey of traffic accidents indicates the educational importance and the economic and psychological significance of research on automobile drivers. Driver education is of course a major factor in school safety education programs. The emphasis upon this topic in recent research is therefore understandable.

A major group of studies has been concerned with testing drivers. Allgaier (2) listed five types of tests judged useful in selecting drivers of commercial vehicles. Road tests were considered more important than either psychophysical tests, skill tests, experience criteria, or written tests. Among the psychophysical tests, visual acuity was rated most important, distance judgment second, and reaction time third. The use of profiles in selection was recommended. Kerr (74) considered self-report data of little value; he recommended extension of the use of tests such as are employed in selection of drivers for public vehicles. Hutter and

Dieter (70) demonstrated that ability to pass a night glare test could be markedly improved by administration of vitamin A, and that the ability varies in the same individual from time to time. Truog (144) described a test for fire motor drivers, which includes five tasks, namely: driving in a straight line, steering within close limits, stopping smoothly when going twenty miles per hour, stopping precisely at a painted cross on the street, and parking the car against the curb in regulation parallel parking. After reviewing tests for drunkenness, Forbes (41) concluded that individual differences are so great that it is not desirable to attempt to set a fixed level of alcohol in the blood or urine as indicative of unfitness for driving.

Another large group of studies has dealt with the causes of accidents. Farmer (39) noted that drivers of commercial vehicles are most often involved in accidents, and he recommended higher standards for truck drivers. He noted that while the act of driving does not require high intelligence, the avoidance of accidents does require mental alertness. Smith (126) concluded that the dependence of accidents upon drunkenness is greatly exaggerated; he pointed out the advantages and limitations of blood tests. Schrenk (113) analyzed causes of accidents, finding the causation complex, with human factors predominant. If his analysis is correct, the most effective tests will emphasize perceptual factors and mental attitudes of drivers. Rawson (107) studied accident proneness, and reported that the only methods of prevention at present available are based upon selection or licensing tests, the study of past records, and elimination of unfit drivers. He reported that accident-prone persons tend to be impulsive rather than thoughtful, and that they tend to reject authority and personal responsibilities.

Vocational Selection

In various sections of this REVIEW, specialized tests have been discussed, and their uses in vocational selection reported. In this section are included only those studies not reported elsewhere.

Carlson and Rich (21) have reported high reliability and validity for a visual adaptation of Thurstone's Auditory Code-Aptitude Test; the visual test was used in a naval training school for signalmen. Harmon and Di Michael (57) have presented evidence of the reliability and validity of a new test for telegraph operators which presupposes auditory discrimination and attempts to measure associative memory and concentration.

Relatively few studies (in view of the importance of the problem) have been made of the use of tests of sales abilities. Kirkpatrick (75) pointed out some of the difficulties in the use of tests in this field, noting that the most useful tools have been standardized personal history blanks, interest tests, personality tests, and interviews. Hilgert (64) reported that only 15 percent of companies use tests, and gave the reasons why the other 85 percent did not use them; he also listed the most used tests. Flemming and Flemming (40) used six tests in studying applicants for selling jobs.

The tests were the Bernreuter Personality Inventory, the Moss Social Intelligence Test, the Washburne S-A Inventory, the Otis Self-Administering Test of Mental Ability, the Canfield Tests of Sales Knowledge, and the Strong Vocational Interest Blank. The analysis was qualitative, not statistical; the pattern of test scores was considered in relation to the pattern needed for the particular job. The patterns needed varied for different jobs and for the same jobs in different companies. The qualitative evaluations of applicants were reported as highly valid in the selection of salesmen. Executives for five companies involving 218 salesmen estimated that 80 to 90 percent of the analyses were accurate in their descriptions and evaluations of the men employed.

A considerable number of studies have dealt with the use of visual tests in industry. Weston (148) reported that fitting workers with suitable glasses improved production in fine work, and resulted in marked improvement in feelings of satisfaction and comfort. Stump (131) presented evidence that use of visual screening tests would markedly reduce the accident rate in an industry, finding significant differences in visual acuities of workers in relation to accident records. Lueck's review (87) indicated that careful study of individual differences in vision would be valuable in fitting persons into industrial work more efficiently. Minton (93) discussed the visual requirements of industrial jobs, dividing the jobs into four groups depending upon their visual requirements. Tiffin (140) indicated how profiles may be used in picking out the better operators in several occupations. Since visual skill patterns are associated with success on certain jobs, Tiffin recommends the validation of particular visual tests for particular groups of industrial jobs.

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CHAPTER IV

Personality Questionnaires

ALBERT ELLIS

SEVERAL noteworthy critical reviews of personality questionnaires have appeared during the last three years. Traxler (83), in his latest survey of the field, concluded that the use of personality questionnaires in guidance programs is still questionable. Maller (57) came to much the same conclusion, pointing out, however, that personality questionnaires are rarely given under the conditions prevailing during the standardization process. Meehl (62) suggested that the main fault with presentday personality questionnaires lies not in their being "structured," but in the casual *a priori* item-construction that often goes into them. Ellis (26) surveyed over 200 validity experiments and concluded that personality questionnaires are of dubious value in distinguishing between groups of adjusted and maladjusted individuals, and of much less value in individual diagnosis.

Other surveys were published by Durflinger (24), who reviewed the personality tests generally used in college prediction; by Hunt, Wittson, and Harris (42), who discussed the use of "screen" tests in military selection; and by Malamud (56), who discussed psychological testing in psychopathological research.

New and Revised Instruments

New and revised personality questionnaires have continued to appear. The *Cornell Service Index* (18), originally devised for military work, was put on the market for more general application. Dodge (21) brought out Form S-C-T of his *Occupational Personality Inventory*, designed especially for work with clerical workers, salespeople, and teachers. Factors G-A-M-I-N of the Guilford-Martin Inventory (60) were isolated and published. Johnson (43) came out with the *Johnson Temperament Analysis*, a 182-question scale purporting to measure several personality traits. MacNitt (55) published the ninth edition of his *Personality and Vocational Guidance Test*. McKinley and Hathaway (53, 54) continued intensive work with the Minnesota Multiphasic Personality Inventory, and reported scales for depressives, hysteria, hypomania, and psychopathic deviates. Schrammel and Garbutt (78) published a *Personality Adjustment Scale*. Shipley and Graham (79) brought out the Personal Inventory, utilizing the forced choice technic.

A great many personality questionnaires, not yet released for general distribution, were reported in research articles. Bennett (5) reported a high measure of validity for Slater's neurotic inventory. Cason (15) claimed reasonably high reliabilities for a 317-item questionnaire for prisoners. Drake (23) devised a special Thinking and Emotional Intro-

version-Extroversion Scale for the Multiphasic Test. Geddes (32) presented a fifty-item questionnaire for seventh and eighth grade boys, but gave no norms. Gray and Wheelwright (34) developed a seventy-five-item questionnaire based on Jung's psychological types. Martin (58) published a paper on his Worry Inventory devised for use with university students. Maslow and his associates (61) reported satisfactory reliability and validity for a clinically derived questionnaire to measure the psychological security-insecurity of college students. Runner and Seaver (76) published a report on their Personality Analysis Test. Watson (85) reported on the validity of the Watson-Fisher Inventory of Affective Tolerance. Werner and Carrison (86) claimed to be able to distinguish brain-injured from normal children by a questionnaire on animistic thinking. Burgess and Wallin (12, 13) devised a moderately reliable engagement adjustment scale, for predicting happiness in marriage. Jurgensen (44) reported that his Classification Inventory, constructed for use in industrial employment situations, showed satisfactory validity and reliability. Several writers (4, 63, 68) published reports on questionnaires designed to distinguish neurotics from adequately adjusted men in the army or navy.

Reliability and Validity Evaluations

The one notable study of questionnaire reliability was that made by Cuber and Gerberich (19). They took sixty widely used questions from the Bell Inventory, the Thurstone Attitude Scales, and other questionnaires; submitted these at three different times to 132 sociology students; and found that 72 percent of the responses were consistent. Factual questions, oddly enough, showed a lower consistency than did attitudinal and evaluational questions.

Validity, rather than reliability, is still the hub of the entire matter of testing personality by the questionnaire method. Kornhauser (46) asked seventy-nine noted psychologists how satisfactory or helpful for present practical use they considered personality inventories of the Bernreuter, Bell, and Humm-Wadsworth type. Only 1.5 percent of these psychologists replied that they considered them highly satisfactory; 13.5 percent thought them moderately satisfactory; the rest deemed the questionnaires doubtfully satisfactory, rather unsatisfactory, or highly unsatisfactory.

A great many validity studies dealing with the Multiphasic Inventory have appeared during the last three years. About half of these studies gave evidence of positive validity; the other half indicated either lack of validity, or only weak validity. Validity studies of other personality questionnaires also turned up a wide array of results; however, applications of questionnaires for "screening" purposes in the army and navy seem to have been rather uniformly successful. For details concerning all these studies, the reader is referred to the review by Ellis (26).

In a recent report, Congdon (17) found a tendency for college students who made lower grades on the Mooney Problem Checklist actually to have more problems. Zapf (88) found that children's responses to a

questionnaire on superstitions correctly forecast their actual behavior in 75 percent of the instances. Adams (3) used the Adams-Lepley Personal Audit, the Guilford-Martin Personnel Inventory, and the Terman Prediction Scale in a study of the prediction of adjustment in marriage. He found low correlations for the first two of these questionnaires and slightly higher ones for the third scale. Burgess and Wallin (12) reported that their engagement adjustment scale correlated .43 and .51 for men and women, respectively, after three years of marriage.

A factor affecting the validity of personality questionnaires is the degree of honesty of responses by the subjects. Fischer (29) found that the mean number of serious problems checked by 102 college students on the Mooney Problem Checklist was significantly greater when signatures were withheld, than when signatures were required. Other studies concerning honesty of response to personality questionnaires have been reviewed by Ellis (26). In general, it appears that personality questionnaires can be "faked," and that complete truthfulness is not to be expected when lack of truthfulness would better suit the convenience or purposes of the subjects.

Construction and Scoring Technics

In the field of scoring technics, Burton and Bright (14) published a method of scoring the Multiphasic Personality Inventory, involving the use of punched cards. This method is claimed to reduce scoring-time to four minutes per test. Kempfer (45) and McClelland (52) proposed simplified methods for scoring the Bernreuter, which save a great deal of scoring-time with only a small loss of test reliability. Schmidt and Billingslea (77) offered a technic for constructing profiles from regular Bernreuter scores. These profiles, they claimed, differentiated normal from deviant individuals with approximately 80 percent accuracy.

Factor Analysis

The use of factor analysis continued as an important tool. Lovell (51) submitted the Guilford-Martin Inventory of Factors STDCR, GAMIN, and the Personnel Inventory to 200 college students and discovered six super-factors. Cattell (16) continued his exhaustive work on trait clusters, and organized 131 phenomenal clusters previously obtained into fifty nuclear ones. Brogden and Thomas (10) worked with twenty-five of the items most heavily loaded in the Bernreuter Sociability Scale and found five primary factors among them, which they named intellectual independence, gregariousness, slowness of reaction, need for primary human relationship, and intellectual leadership.

Applications in Educational Appraisal and Guidance

Applications of personality questionnaires in educational areas have been many and diverse. Blair (7) studied the personality adjustment of ninth-grade pupils with the California Test of Personality as well as the

Multiple Choice Rorschach Test, and found no high relationships between the two tests. Engle (27) used the Bell Adjustment Inventory to see if overage school children differed from normal ones, but found no outstanding differences on any of the Bell scales. Ogan (67) investigated the wartime problems of college students with a problem checklist and discovered a high incidence of frustration, hysteria, cynicism, despair, and misapprehension. Woolf (87) studied the relationship between home adjustment and the responses of junior-college students to the Bell Inventory, reporting that a poor home adjustment is accompanied by unsatisfactory behavior on the part of the students. Mooney (65) utilized his own Problem Checklist on freshman girls and discovered that they had an average of thirty problems, with 60 percent of them desiring an individual conference to discuss their problems. Houston and Marzolf (41) found that the Mooney Problem Checklist could be very helpful when given to students and then discussed by the faculty members. Pugh (70), employing the Symonds Adjustment Questionnaire on Negro students in mixed and in separate high schools, reported little difference between these groups in their total adjustment scores.

Several investigators employed personality questionnaires in an effort to discover significant relationships between scholastic achievement and personality self-ratings. Griffiths (36), using the Bell Adjustment Inventory, found no better adjustment for men with brilliant scholastic records in college than for men of lowest academic achievement. Spinelle and Nemzek (81), employing the Link Inventory of Interests and Activities, found that the correlation yielded by the inventory and measures of school success was low, and did not possess direct value for educational or vocational guidance. Thompson (82) gave the California Test of Personality to dental school students and found very low correlations between their test scores and their theory and technic and practicum scholastic criterion scores. Typical of several other studies, Bennett and Gordon (6) reported that the Bernreuter Inventory, when used with nursing school students, was of little or no predictive value.

Paper and pencil tests of personality have also been rather widely used in the last three years, in attempts to measure teaching success. Dodge (20) gave his *Occupational Personality Inventory* (21) to 301 teachers and found that those rated by their supervisors as more successful reported themselves on the test to be (a) more at ease in social contacts; (b) more willing to take initiative and to assume responsibility; (c) less subject to fears and worries; (d) more sensitive to the opinions of others; and (e) slower to make decisions. Gotham (33) used the Bernreuter, Washburne, and Rudisell Inventories with elementary-school teachers and tried to determine the relationship between scores and degree of change effected in the pupils by the teachers under observation. No significant relationship was observed. Lough (50) gave the Multiphasic Personality Inventory to 185 unmarried women students in a teachers college and reported that they were a relatively stable, normal group

with a very slight tendency toward hypomania. Valentine (84) devised a schedule of fifty questions for professors to ask themselves in order to check on their own teaching proficiency, but reported no norms for the test. Retan (72) used the Pressey and Bernreuter Tests to investigate the relationship between emotional instability and teaching success. She concluded, interestingly enough, that records of the 152 individuals she studied "indicate that emotional instability is not conclusive evidence of unfitness for teaching" (72, p. 141). Bollinger (8) employed the Washburne Social Adjustment Inventory, the Bell Adjustment Inventory, and the Symonds' What Kind of a Year Are You Having Tests in his study of the social impact of the teacher on the pupil. He found some significant differences among the groups of teachers in three different schools.

Clinical Diagnosis and Treatment

Many recent applications of personality questionnaires have been in the area of clinical diagnosis and treatment. Brozek, Guetzkow, and Keys (11) utilized the Multiphasic Test in a study of the personality changes occurring in normal young men maintained on restricted intakes of vitamins of the B-Complex. Grinker and his coworkers (37) used a 121-item questionnaire to investigate predisposition to operational fatigue. Pratt (69) administered a questionnaire to 267 boys and 303 girls in a study of the fears of rural children. He found that girls have more fears than do boys, and that there was some evidence that the number of things feared increased with age. Rashkis and Shaskan (71) employed the Multiphasic Inventory to evaluate the results of group psychotherapy. Richardson (75), using the Guilford-Martin Inventory of Factors STDCR, found the stutterers to be significantly different from non-stutterers in social introversion, depression, and happy-go-lucky tendencies.

Surveys of Specific Groups

Personality questionnaires have been frequently used in studies of racial, religious, sex, or other groups. For example, Engle and Engle (28) employed them with Amish and non-Amish school children; Kuhlen (47) compared the Pressey scores of Japanese, Chinese, and white pupils in a Hawaiian high school; and Long (49) utilized the Bell Adjustment Inventory in a study of Jewish and non-Jewish subjects. This method of employing personality inventories is not usually a propitious one for several reasons: (a) the investigator (or his readers) tend to assume a validity for the instrument which has seldom been established; (b) false emphasis is often placed on intergroup rather than intragroup differences; (c) dangerous, anti-democratic "facts" are sometimes sought and found; (d) the results are more often than not meaningless or unimportant.

Occupational Guidance and Selection

As usual, several published reports have dealt with the use of personality questionnaires in occupational guidance and selection. Abramson (2)

used the Minnesota Multiphasic Personality Test for the selection of specialized military personnel and found it fairly helpful. Dorcus (22) studied the Humm-Wadsworth and the Guilford-Martin Personnel Inventories in an industrial situation and reported that caution should be exercised in their use. Forlano and Kirkpatrick (31) used the Bell and Washburne Tests in the selection of radio-tube mounters and found a high degree of relationship between test scores and supervisor's ratings of employees. Harmon and Wiener (40) used the Multiphasic Inventory as part of a test battery for the vocational diagnosis of disabled veterans applying for rehabilitation, and found it an instrument of prime utility. Martin (59), working with the Guilford-Martin Personnel Inventory on aircraft and textile employees, claimed that it was able to disclose from 82 to 85 percent of the workers who, in management's opinion, later proved to be malcontents. Mittelmann and his associates (64), administered the Cornell Selectee Index and the Cornell Word Form Test to industrial personnel and found that they both differentiated significantly between individuals with moderately severe or severe personality disturbances and those without such disturbances as revealed by a psychiatric interview.

Studies of the Nature and Dynamics of Personality

As might be expected, a good many recent studies of the nature and dynamics of personality have had recourse to personality questionnaires. Three studies involving parental variables yielded positive results: Lewis (48) found that children whose parents are rated by teachers as having "superior" attitudes toward the child and the home do, in general, obtain more desirable personality test scores than children whose parents received "inferior" ratings. Dyer (25), employing the Bell Inventory on 100 "only" and 100 "non-only" children, reported that, in regard to total test scores, the "only" children seemed to be about as well adjusted as the "non-only." In regard to the "home" and the "emotional" areas of the Bell Test, the "only" children made somewhat better scores than the "non-only." Smith (80), applying the Terman-Miles Masculinity-Femininity Test to sorority girls and their parents, found tendencies for the more decidedly "feminine" girl to have a more "feminine" mother and a more "masculine" father.

Morgan (66) applied the Loofbourow-Keys Personal Index to a group of visually handicapped twelve-year-olds. This group exhibited a higher degree of personality and social maladjustment on the index than did normal children. In a series of four papers, Hanawalt and Richardson (38, 39, 73, 74) found that some of the Bernreuter scales distinguished significantly between various kinds of leaders and nonleaders, while others of the scales did not.

Lack of relation between personality questionnaire scores and other data was reported in four studies. Fiske (30) found no direct relationship between somatotype groupings and scores on the Bernreuter Personality Inventory. Boynton and Wang (9), using the Boynton Personality Inventory, found little relationship between children's play interests and their

emotional stability scores. Gray (35), utilizing a sample of 600 sixth-grade pupils, found no statistical difference between emotionality scores on the Boynton Personality Inventory and a measure of their variability on achievements tests. Abramson (1) employing the Multiphasic Test, found that, in general, a subject expressed the same attitudes when mildly under the influence of alcohol as when sober.

Summary

An examination of research studies in the field of personality questionnaires during the last three years leads to the following conclusions:

1. Paper and pencil tests of personality are still being very widely used by educators, psychologists, and sociologists for both research and clinical purposes.

2. Interest has shifted largely from the older personality inventories to the newer ones like the Guilford-Martin, Humm-Wadsworth, Cornell, and—especially—the Minnesota Multiphasic questionnaires.

3. While experimenters continue to report satisfactory reliabilities for most of the tests employed, validity studies bring forth many unsatisfactory and highly questionable results. Authors of tests tend to find their instruments quite "valid," but other observers frequently do not corroborate these findings.

4. The validity of personality questionnaires seems to be much higher for some uses than for others. For purposes of distinguishing between good or bad students or teachers, the tests are woefully inadequate. In clinical diagnosis, their record is somewhat better. In occupational situations, and in military screening, it seems, on the basis of the most recent reports, that the inventories give fairly satisfactory results.

5. There is a continued pernicious tendency on the part of many experimenters to employ personality questionnaires whose validity is still very much in doubt and, on the basis of scores on these tests, naively divide their subjects into "neurotic" and "normal," or "introverted" and "extroverted," or some similar dichotomous groupings.

6. There can be no doubt whatever that a great deal remains to be done in the construction, evaluation, and application of personality inventories. Further research designed to increase test validity is still the crying need in this area.

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CHAPTER V

Interests and Attitudes

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INTERESTS and attitudes pervade a large proportion of all behavior, and may correspondingly be inferred, by various technics of observation and measurement, from a wide variety of human responses and activity. The present chapter, however, is confined to the verbal-response type of measurement which characterizes most "tests." This is a limitation which must be borne in mind, since verbal-response tests in this sector—as, indeed, thruout the whole field of personality—cannot be relied upon for the whole story. Some nonverbal, or less highly verbal, technics of personality measurement are considered in the next two chapters of this issue.

Interests

Surveys and Reviews

Outstanding among all the recent studies of interest inventories was the publication, late in 1943, of Strong's *Vocational Interests of Men and Women* (110). This work surveys vocational-interest testing from its beginnings to the present. The book covers the important materials on the Strong Test in so thoro a manner as to preclude adequate consideration in the space allotted here. Fortunately, Super (114) has already published an excellent comprehensive review. Suffice it to say that Strong's treatment is characterized by excellent organization, lucidity of style, objectivity, and freedom from exaggerated claims—qualities not always found in the proponent of a specific testing procedure.

Several of the findings detailed by Strong should be of special interest to educators. Thus, he shows that patterns of interests are already clear and stabilized enough at adolescence to serve as useful guides in vocational counseling; that there is a high degree of relationship between scholastic interests and graduation from a selected course, altho not between scholastic interests and grades in the course; and that there seems to be little difference in the teaching-interest scores of successful and unsuccessful teachers.

Another very important review of interest testing that cannot, because of space limitations, be adequately reviewed here, is Carter's (15) *Vocational Interests and Job Orientation*. This brief but comprehensive ten-year survey of the field emphasizes several significant points, including the contention that the measurement of vocational interests by means of modern inventory technics is about as reliable as the measurement of intelligence by means of group tests (15, p. 68). Like Strong's book, Carter's monograph is *must* reading.

Two other noteworthy surveys of vocational interest tests, by Berdie (4) and Hahn (48), appeared during the last three years. Berdie con-

cluded that vocational interests arise not from one main factor, such as ability, schooling, or family influences, but from a multiplicity of almost all possible conditions. Hahn showed that norms of the Kuder Test are still inadequate, and that validity is more assumed than proved. Hahn did, however, find unusual promise in terms of data now being processed by the test's author.

New and Revised Instruments

Several new or revised interest inventories appeared during the last three years, some of them especially adapted for school use. Dunkel (30), for example, published a report of an Inventory of Students' General Goals in Life. Horrocks (59) experimented with an interest-in-subject test, which proved to have reasonable validity when used with high-school and junior-high-school students. Jones (61) put out the *ICW Interest Record* for use with children. Barry (2) published some Kuder Preference Record norms based on measurements made on 1500 high-school seniors. Cleeton (16) brought out a revised edition of the *Cleeton Vocational Interest Inventory, Form A*.

In the occupational field, Brainard and Brainard (11) published an *Occupational Preference Inventory*. Larus (71) brought out a *Vocational Preference Index*. Lee and Thorpe (73) constructed an *Occupational Interest Inventory*. Older (92) and Super and Haddad (115) reported on the Super-Older Vocational Interest Test. This last instrument departs somewhat from the conventional interest inventories, in that the subject is asked to answer a set of true-false questions based on films of occupational activities. Older reports fair agreement between test scores and expressed occupational preferences. It would appear that more research might well be done with interest tests of this type.

Reliability and Validity Evaluations

A fair amount of work was done during the last triennial period on the evaluation of interest inventories. Hartson (57) made a follow-up study of the Oberlin Vocational Interest Inquiry fourteen years after its original use, and found a correlation of .72 between the scores of twelve subjects tested on the two different occasions. Triggs (118) studied the relation of Kuder Preference Record scores to other measures, and found them to be reliable enough for use in counseling individuals. She also found a fair amount of agreement between interests as measured by the group scales of the Strong Vocational Interest Blank for Men and scales of the Kuder. Wittenborn, Triggs, and Feder (124) compared scores on the Strong and Kuder blanks and found agreements in some scales and disagreements in others. Triggs (119) again compared Strong and Kuder scores and found reasonable agreement. Thompson (116) found some degree of correlation between Kuder scores and the success of dental-school students. Bolanovich and Goodman (10), on the other hand, discovered low cor-

relations between Kuder scores and final grade averages of sixty-six RCA Cadettes enrolled in a training program for electrical engineering aides.

Construction and Scoring Technics

In the field of construction and scoring technics, the controversy between the proponents of simple and complex weightings of item responses continued. A paper by Strong (111) on weighted *versus* unit scales concluded that unit scale scores, if employed with the Strong Vocational Interest Blank, would "lead to different counseling from weighted scale scores in from one-sixth to one-twelfth of the cases" (111 p. 215).

Kuder also published a paper (70) answering an attack on the method of classification of items in the Kuder Preference Record.

A special scoring key for the Kuder Preference Record was devised by the Staff of the Personnel Research Section of the Adjutant General's Office (106) for use in assigning enlisted men to recruiting functions in the army. Dunlap and Harper (31) presented a method for making profiles by an interest-area method, for use with the Strong Vocational Interest Blank.

Applications of Interest Inventories: Educational Appraisal and Guidance

As usual, the last three years saw the publication of a good many studies in which interest inventories were applied for research and experimental purposes. Some of these applications were especially noteworthy in the area of educational appraisal and guidance.

Barrett (1) tested art majors and control subjects on the Strong Scale for artists, and found that high scores on the test were more often than not associated with successful specialization in art. Berdie (5) gave the Strong Interest Blank to engineering students, and discovered that neither academic achievement nor the amount of satisfaction expressed by a student in his course can be predicted by his score on it. Crider (22) administered the Strong Blank to nursing students and found that as a selective or a prognostic device it did not prove to be significant. Detchen (26) gave the Social Science Interest Test, as well as a comprehensive examination in the social sciences, to a group of college students, and found a correlation of .78 between their scores on both tests. Klugman (65) used the Strong Blank for Women on vocational-high-school students and found that those having more permanent clerical interests were not superior to those having less permanent interests. He also noted (66) that a year of schooling had no tendency to improve the negligible relationship existing between clerical interest and aptitude test scores. Lorimer (82) reported on the use of the Strong Blank on Columbia College students. In a follow-up study of 241 students who were advised to enter certain occupations partly on the basis of Strong Test results, she found that 82 percent of the group were successfully and happily engaged in those occupations. Roberts (97), using the Wonderlic Personnel Test and Kuder Preference Record on graduate engineers, found them to have a strong distaste for clerical work, and noted

that, if these findings were generally true, engineering colleges might well consider measures to diminish the emotional resistance to clerical work needed in engineering. Roeber and Garfield (98) administered a vocational preference inventory to 1955 ninth- to twelfth-grade students, and found that in general the most favored occupations were accorded much the same rank among the different grade levels. Long (81) found a relationship between Strong Test scores and Zyve Scientific Aptitude Test scores for college students.

Occupational Guidance and Selection

As would be expected, several recent studies applying interest inventories to occupational areas were reported in the literature. Berdie (6) constructed an interest scale of twenty-two items for use on successful and unsuccessful marine recruits. He found the critical ratio of the difference between the mean scores of these two groups to be 9.7 and concluded that "beyond all doubt the scale differentiates between the two groups" (6 p. 280). Hahn and Williams (49) experimented with the Kuder Preference Record on Marine Corps Women Reservists and found that with the use of this test three groups of clerical workers—stenographers, clerk-typists, and general clerks—could be successfully divided into satisfied and dissatisfied workers. Lehman (75) gave the Kuder to three kinds of home economists—teachers, hospital dieticians, and business women. She noted that there seemed to be distinct differences among the three groups. Strong (112) investigated the interests of forest service men with his own Vocational Interest Blank and found that, in general, they have interests similar to those of skilled tradesmen, particularly farmers, of production managers, of engineers, and of public administrators. Strong (113) also investigated the interests of senior and junior public administrators, and found them to differ somewhat—enough to suggest that a fourth to a third of the juniors did not have the interests of the senior administrators. Uhrbrock (121) submitted five sets of very comprehensive interest questionnaires to 242 employees, and presented percent norms for his group.

Studies of the Nature and Dynamics of Personality

Altho most interest inventories are designed primarily for vocational selection, they are occasionally employed for clinical purposes and for studies of personality. Several such uses were reported in the literature of the last three years. Harris (54) used a play activity inventory in a study of delinquent boys and found it to be both feasible and rewarding. He discovered that certain leisure-time interests of delinquent boys are closely associated with their behavior. Jones and others (60), in their comprehensive study of an adolescent boy, utilized the ICW Interest Record, the Strong Vocational Interest Blank, and the Lehman and Witty Play Quiz. Tyler (120), employing the Strong Blank as well as the Minnesota Personality Test, found a relationship between social adjustment and Strong scores. Berdie (7) used an interest test and the Multiphasic Personality

Inventory on university counseling bureau cases, and found a relationship between range of interests and scores on five of the Multiphasic Scales.

Summary

From the amount of research activity on interest inventories during the last three years, it may be concluded that these tests are considered to be of real importance by a large group of educators and psychologists. That their confidence in the interest inventory is not misplaced is at least partly proved by the fact that, in the period under consideration, the majority of studies have been favorable. However, there are still enough negative and on-the-fence indications to show that much remains to be done in establishing high predictive validity for the most popular of the inventories now in use. Users of the tests, in both educational and vocational situations, must still be warned to be extremely cautious in regard to individual diagnosis and prediction.

Attitudes, Opinions, and Morale

The present section continues and extends the previous reviews by Traxler (117), Darley and Anderson (24), and Murra (90).

General Methodology

McNemar's lengthy review of Opinion-Attitude Methodology (87) requires special mention. McNemar indicated: (a) that attitude scales and single-question opinion technics, respectively, permit only a rank-ordering (rather than the precise quantitative measurement) of individuals and of groups; (b) that both attitude testers and opinion gaugers are too often content with low degrees of reliability; (c) that internal consistency offers a criterion of reliability rather than of validity; (d) that opinion pollers validate in terms of group voting rather than in terms of individual behavior; (e) that some attitude testers have denied that there is any validity problem because, they contend, the verbal expression of attitude has its own intrinsic validity; and (f) that attitude and opinion testers too often combine dissimilar functions into what they assume to be a meaningful whole, instead of developing uni-dimensional scales. Replies to certain of McNemar's critical comments appear in the November 1946 issue of the *Psychological Bulletin*.

Measurement technics—The most widely used technics are the equal-appearing interval method of Thurstone, the internal consistency or summated ratings method of Likert, and the interview method. Less widely used are methods involving self-ratings, between-group differences, paired or "forced choice" statements, verbally stated situations, projective technics, and the scalogram (47).

The equal-appearing interval method was studied by Farnsworth, who used a prejudging technic for evaluating scale intervals (38), found con-

siderable merit in the Allport graphic method of scaling (39), and discovered appreciable shifts in item values with the Seashore-Hevner sorting method when two groups of judges adopted extremely differing attitudes by request (40). Edwards (33) studied the neutral items of Thurstone scales, while Edwards and Kenney (34) compared the Thurstone and summated-ratings or Likert technics. Eisenberg (35) compared two methods of scoring results on a like, indifferent, and dislike response pattern.

Interviewing technics and patterns have received much attention from public opinion pollers (12, 44). A study in depth interviewing by Link (78) developed a technic which was objective, in the sense of not depending upon the characteristics of the interviewer; the results were also readily subject to tabulation and analysis. The projective method was used by Proshansky (96), who made exploratory use of Murray's Thematic Apperception Test.

Scaling technics less widely used than the Thurstone are a simple non-mathematical "scalogram" method reported by Guttman (47), and a tabulation method studied by Goodenough (45); both methods were used by the army in its studies of morale. McCormick (85) suggested the substitution of a simple chi-square modification for the common scale technics in analysis of results.

Validity and reliability—The dearth of studies dealing with the troublesome problem of validity is particularly noticeable. Blankenship (9), Gallup (44), and Katz (62) studied validity by means of the agreement between poll results and election returns. Connelly (17) studied the validity both of predicting election returns and of predicting turnout of voters.

Reliability studies, apart from those which deal with the accuracy of scaling, appear to be concerned mainly with agreement of results by different polls, with interview technics, with the framing of questions, and with sampling adequacy. Cantril (12) compared results from four public opinion polls, finding satisfactory agreement. Dodd (29) re-asked questions and King (64) compared results of two interviewers in their studies of reliability. Eysenck (37) compared several factor analysis studies of social attitude. The controlled sample technics of the leading American polls were examined by Connelly (17), while Hansen and Hauser (51) described the basic principles of the area-sampling or pinpoint method. Benson, Young, and Syze (3) experimented with the area-sampling method and the secret ballot. Lazarsfeld and his associates (72) made an experimental study of a panel sampling method over a period of some months.

Measurement of Attitudes

Students of attitudes have expanded into the related areas now known as opinions and morale. College students and, to some degree, high-school students remain the principal subjects, altho some tendency may be noted to study younger children and adult groups. Conrad and Sanford (19) pointed out the practical and theoretical advantages of college samples;

McNemar (87), however, favored the use of cross sections of the general population (with some restriction as to age).

New attitude instruments and technics—Altho many scales for the measurement of attitudes were developed, only a few were the result of research directed primarily toward that result. Hanchett (50) reported pretesting results for the first two of what is intended to be a nine-scale set for measuring attitudes toward the British. A Likert-type scale measuring anti-Semitism, which was developed by Levinson and Sanford (77), was studied in relation to a variety of personality factors. Marks (83) combined Thurstone and Likert technics in producing scales for testing attitudes of Negro youth toward both whites and Negroes. Ferguson (42) revised his scales of primary social attitudes.

Scales, questionnaires, checklists, and other devices were constructed as means toward the attainment of other ends in many studies. Altho scales (18, 20, 23, 28, 36, 52, 104) were the most common, questionnaires and checklists (21, 89, 93, 94, 101, 107) and reports of imaginary or fictitious situations (84, 102) were also evolved.

Studies of attitudinal status—So many investigations of group attitudes have been made that it is possible here only to indicate their scope as to groups of persons studied and issues toward which attitudes were measured. The easily accessible college student was the subject of many investigations. Morgan (89) reported on the attitudes of college students toward the Japanese. Attitudes of college students toward such issues as student honors, vocations, intercollegiate activities, and the United States Constitution were surveyed by Knode (67), while Seward and Silvers (102) studied the attitudes of college women toward accuracy in newspaper reports.

Sanford and associates (100, p. 323) studied the relation of "sentiments" to behavior and fantasy. Duvall and Motz (32) studied the attitudes of girls and young women toward family living. Dinkel (28) reported on the attitudes of high-school and college students toward supporting aged parents, and Smith (104) dealt with the attitudes of children, adolescents, and adults toward Soviet Russia. Legislators were surveyed by Hartmann (56), and both congressmen and administrators at the policy-making level were studied by Kriesberg (69) with respect to their judgments concerning public opinion polls. Le Gulf and Hopkins (74) measured the attitudes of British propagandist society members toward social and political issues. Other studies of special groups were those of Moreton (88) on the attitudes of teachers and pupils toward coeducation, of Patrick (93) on the attitudes toward women executives in government, and of Stagner (107) on the opinions of psychologists with respect to peace planning.

Studies of attitudinal trends—Studies of attitude changes over long periods of time, and of changes presumably resulting from certain learning situations, appear to be less numerous than are status studies. Pressey (95) noted less concern in 1943 than in 1923 on the part of school and college students from grades six to sixteen with regard to social taboos, inhibitions,

and fears. Lentz (76) and Stagner (108) studied attitudinal changes of college men and young adults, respectively, from prewar to war years on issues of war and aggression. Blake and Dennis (8) investigated the developments of stereotypes concerning the Negro.

Calling intraception-extraception "a basic attitude underlying action," Sanford and associates (100, p. 643) concluded that between the ages of five and fifteen intraception follows a U-shaped course of development, being most pronounced for the youngest and oldest subjects.

The effects of a motion picture having a Nazi theme upon high-school pupils' attitudes were investigated by Wiese and Cole (122), thru the use of oral and written reports. Using several Thurstone scales, Smith (105) found greater homogeneity of attitudes among college students after the study of sociology than before. Di Michael (27) studied changes in teachers' attitudes toward pupil behavior as a result of taking mental hygiene and educational guidance courses.

Correlates and effects of attitudes—The correlates of attitudes which have received most attention appear to be those commonly studied under the psychological heading of individual differences, altho attitude testers have also gone considerably farther afield in the selection of some variables. Fewer recent studies have dealt with such relationships as that between information and attitude, or with the effects of attitudes upon learning.

Crespi (20) used a social rejection thermometer similar to the Bogardus scale of social distance in studying the correlates of college students' attitudes toward conscientious objectors. McGranahan (86) surveyed differences between American and German youth. Ferguson (41) investigated sex differences of college students in certain social attitudes, while Gundlach (46) investigated regional differences in the evaluation by college students of enemy, ally, and domestic national groups. Attitudinal differences among college students of three religious faiths were studied by Sappenfield (101). Kerr (63) surveyed the literature with respect to the liberalism-conservatism continuum on political and economic issues and drew conclusions concerning correlates under such headings as age, sex, race, occupation, religion, intelligence, and education.

Newcomb (91) concluded that both the "attitude climate" and information acquired and retained on a recent social issue are a result of the individual's mode of adjustment to the community. Cantril (14) studied the relationship between intensity and direction of attitudes toward the Negro and toward government regulation of business. The influences of attitudes upon reading interpretations of high-school pupils were studied by McCaul (84). Perry (94) investigated the influence of student dreads upon their attitudes toward school subjects.

Measurement of Opinions

The verbal expressions of attitudes often defined as opinions are usually studied by single questions or by short series of related questions. The

data are ordinarily collected by the interview method. Public opinion polls, conducted largely by journalists, have received acceptance as the major source of opinion research. Findings from studies of public opinion appear most often in newspapers and nontechnical periodicals, altho the *Public Opinion Quarterly* and other professional journals often carry summarizations of poll results.

Three extensive descriptions of opinion polling methodology are worthy of note: by Gallup (44) on the American Institute of Public Opinion, by Cantril (13) on the Office of Public Opinion Research, and by Blankenship (9) on consumer and opinion research. Other polling organizations are the National Opinion Research Center, the Fortune Survey, the Crossley Poll, and (at the secondary-school level) the Scholastic Poll and the Purdue University Poll. Representative both of the methods and the findings of the Index of Public Opinion of the Psychological Corporation are the reports by Link (79, 80). Skott (103) discussed attitude research technics of the Department of Agriculture, Woodward (125) discussed problems encountered and methods used in government research on attitudes, and Ferraby (43) presented the "Mass Observation" procedures of an English polling organization.

Crespi (21) conducted a poll of attitudes toward conscientious objectors; the attitudes, as measured, were much more favorable than might have been anticipated. Williams (123) surveyed regional differences in opinions concerning international cooperation. Davenport (25) advocated the local, systematic polling of high-school students, and use of the results as a "guide to guidance."

Measurement of Morale

Scientific studies in that attitudinal area now known as morale, using technics very similar to those of attitude studies, have increased tremendously in significance as a result of recent world events. The establishment of the Morale Services Division of the Army Service Forces, and later of the Information and Education Division, U. S. War Department, bear out this fact.

Defining optimism as one aspect of morale, Conrad and Sanford (18) developed three scales for the measurement of war optimism—one on military optimism, one on optimism concerning consequences of the war, and one on general or personal optimism. Estes and Estes (36) standardized eleven miniature scales of war morale. Conrad and Sanford (19) studied several aspects of war optimism among college students. The war morale of rural adolescents and their parents was investigated by Stott (109). Cronbach (23) surveyed the general and personal optimism of high-school pupils.

Sanford and Conrad (99) intensively studied one case each of high and low national morale, while Henderson and Tinnes (58) surveyed the national morale of high-school pupils, college students, and adults. Cantril (13) dealt extensively with the measurement of civilian morale.

Harding developed two value-type instruments, a generalizations test (52) and a problemmaire (53), for which he selected content from philosophy, social psychology, and sociology. Hart (55) developed a value judgment scale of happiness-unhappiness, intended to be more valid than the monetary scale for rating human experiences and achievements. Kornhauser (68), surveying employee morale methodology, discussed several types of interviewing and questionnaire technics, raised some critical questions, pointed out general difficulties, and outlined the analytical methods available for morale studies.

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CHAPTER VI

Rorschach Methods and Other Projective Technics

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DURING the three years since Symonds and Krugman (159) last reviewed research in projective technics for the February 1944 issue of this REVIEW, there has been no diminution in the interest of psychologists and educators in these testing methods. Even a period of the gravest international political and economic developments could not apparently dampen the ardor of researchers.

The present review follows the pattern set by the 1941 and 1944 surveys in this REVIEW, except that the Rorschach Test is now covered in a separate section.

Rorschach Methods

General

A number of noteworthy texts have appeared. Beck's (12, 13) two volumes include descriptions of scoring categories, scoring problems and examples, discussion of psychological meanings of categories, and forty-three illustrative records covering a variety of personality pictures. Two volumes on *Diagnostic Testing* by Rapaport, Gill, and Schafer (117, 118) aim to present the theory, statistical evaluation, and diagnostic application of a battery of tests employed at the Menninger Clinic. Considerable space is devoted to the Rorschach technic. Bockner and Halpern (18) have published a revised edition of their book, and Klopfer and Davidson (80) have added a supplement to the Klopfer-Kelley manual.

In two recent surveys of psychologists' opinions (Kornhauser, 82, and Faterson and Klopfer, 39), a majority indicated that the Rorschach Method has a definite place in the field of general psychology, and that it has clinical value if used by trained persons; but vigorous statements were also made in terms of lack of objectivity, reliance on personal norms and subjective evaluation, lack of validation, limited clinical application, and "cultism."

Replying to various criticisms of the Rorschach Method (such as the lack of objectivity), Munroe (98, 99) formulated and analyzed the method as a dynamic technic, and emphasized the need for a fairer perspective and for more appropriate standards of value.

Methodological Problems

In the last three years there has been less research on the objective and standardized approach, and more application of the method in various fields. Some advances can be reported, however. More efficient methods for recording responses by use of code systems have been advanced (Beck, 12; Hertz, 62), and a revised psychogram for summarizing Rorschach data has been published (Hertz, 65). Scoring of the various test factors

is treated in detail in the new volumes mentioned above. Hertz (62) has published a revised and amplified edition of her Frequency Tables, concentrating on form accuracy, but including also code charts for locating responses, and lists of normal details and of popular and original responses. Scoring criteria and other objective data for children have been presented by Vorhaus (164) and by Hertz and Ebert (66). A new proposal for appraising the form level by means of rating scales has been published by Klopfer and Davidson (80), who expand the term form level to include three form qualities, accuracy, specification, and organization. This last is separately handled by Beck with his "Z" factor and Hertz with her "G." Goldfarb (47) presented the only systematic study of organization activity, comparing Beck's "Z," Beck's "Z" applied only to F+ responses, Goldfarb's revision of the Klopfer-Davidson form-level scoring, and four tests of abstract ability. None of the correlations computed were significant.

Schachtel has contributed two valuable theoretical papers; one (143) on the dynamic relationships among color, feeling, emotion, and affect; the other (144) on the significance of the subject's definition of the Rorschach situation in terms of personal and cultural patterns, which determines his attitudes and which affect his performance.

Problems associated with the popular response factor were considered by Hallowell (52), based on his analysis of frequencies of responses in a group of American Indian subjects. The psychometric scales for scoring Rorschach responses offered by Zubin, Chute, and Veniar (174) provide for more exact quantification of the Rorschach Method. The comparative merits of this technic and the traditional method remain to be established.

A more detailed analysis of content of the Rorschach responses has been advocated in the last few years. Rapaport and others (118) have attempted in their book to systematize conspicuous verbalizations, and to explain the psychological processes leading to deviant ones. Interest has been focused on specific kinds of content by Goldfarb (48), who emphasized the psychological significance of the animal symbol; and by Goldstein and Rothman (50), who called attention to the factor of physiognomic attitude as expressed in Rorschach responses.

Norms

The need for standards of comparison has inspired investigators to amass norms for various age groups, mental levels, developmental levels, and for different cultures. Normative data are included in the manuals of Beck (12) and of Rapaport and others (118) for groups of different mental level, of varying personality pictures, and for various diagnostic groupings. Several studies include norms for preschool children (Swift, 156), school children (Kay and Vorhaus, 78, Vorhaus, 164), for superior seven-year-old children (Gair, 42), and for six- and eight-year-old children (Hertz and Ebert, 66), junior-high-school boys and male college students (Hertzman and Margulies, 67), and superior boys and girls (Davidson, 30). Hallowell (52) presents norms for other cultures.

Unfortunately research in the establishment of norms has of necessity been sidetracked by more immediate large-scale problems. There are still serious omissions for certain age-groups and for certain personality pictures. While many examiners claim success in proceeding without them, one achieves greater precision in interpretation when it is possible to apply norms appropriate to the subject.

Reliability

There have been few developments in establishing the reliability of the Rorschach Method in the last three years. Fosberg's early study demonstrating the high test-retest reliability has been elaborated by a subsequent study (40) on how subjects tried to fake results. Even with "test-wise" subjects, fundamental Rorschach patterns were little altered. He concluded that certainly "test-naïve" subjects could not influence the method.

Swift (155), working with forty-one preschool children, determined reliability of the various scoring categories over various time-intervals. The results were offered to justify the clinical use of the Rorschach Method as a reliable technic.

While no other systematic studies have appeared, it should be noted in the clinical studies discussed later, where the Rorschach Test is repeated under experimentally varied conditions, that the stability of the method is indicated.

Validity

A few studies have attacked the problem of validity directly. Many, however, utilizing the Rorschach Method for other purposes, have indicated its validity.

Studies where the Rorschach Test is given under experimentally altered conditions demonstrate the extreme sensitivity of the method to changing conditions or attitudes or emotional states, and furnish experimental evidence of its validity. Thus Stainbrook (150), using a modified form of the Rorschach presentation, assembled composite Rorschach psychograms for each five-minute interval following the onset of an electroshock convulsion and demonstrated progressive changes in Rorschach results. Morris (96) reported that reliable changes in pre- and post-treatment records paralleled the clinical improvement. Again, Rorschach studies made on subjects smoking marihuana cigarettes (Williams and others, 171) before and after medication indicated changes in patterns which could be verified by other technics and by clinical observations. Levine, Grassi, and Gerson (87, 88), using the verbal and graphic Rorschach, demonstrated the sensitivity of the test to mood-changes induced, under hypnosis, by the use of emotionally vivid suggestions.

In comparing Rorschach results with outside criteria, some few studies use correlational procedure; others, the matching technic. Still others are content with demonstrating general correspondence. Swift's study (154), designed to investigate the correspondence between Rorschach measures of

insecurity (in terms of ratings and "signs" based on Rorschach records) and behavioral measures (obtained from a teacher's rating scale and parent interviews) yielded generally negative results. Greater success was obtained, however, in another study (153) in the matching of Rorschach analyses of thirty preschool children and teachers' descriptions. Waehner (165) matched analyses of the spontaneous drawings and paintings of fifty-five college students with Rorschach interpretations, showing correct matching in 87 percent of the cases.

Innumerable studies of validation are based on comparisons of contrasted groups of varying age, intelligence, background, school achievement, of different race or nationality, of deviated personality, and of various kinds of mental disorders. Many of these utilize the method of equating groups for various factors. In the last three years, comparative group studies have included:

preschool children

loved, not loved, pseudo-loved (Schachtel and Levi, 142)

school children

high average, six and eight years of age (Hertz and Ebert, 66)

non-reading children and clinic children (Vorhaus, 164)

retarded, good, superior readers (Gann, 43)

superior children, nine thru twelve years of age (Davidson, 30)

adjusted and maladjusted children (Davidson, 30; Gair, 42)

children with tics (Piotrowski, 112)

stutterers and non-stutterers (Krugman, 83; Meltzer, 94; Richardson, 122)

adolescents

"institution" and "foster home" (Goldfarb, 46; Goldfarb and Klopfer, 49)

junior-high-school boys (Hertzman and Margulies, 67)

college students

achieving and non-achieving college men (Steinzor, 152)

male students (Hertzman and Margulies, 67)

adults

Kansas highway patrolmen (Rapaport and others, 118)

mechanical workers, outstanding and non-outstanding (Piotrowski and others, 114)

malingerers (Benton, 16)

sociological groups

Spanish and English refugee children (Tulchin and Levy, 162)

Many outstanding contributions deserve special mention. Hertzman and Margulies (67) showed reliable developmental changes in personality by comparing equated groups of junior-high-school boys with male college students. In a study of personality in relation to the economic background of intellectually superior children, Davidson (30) found that despite the uniformly high intelligence ratings, the group revealed a wide disparity in personality patterns. Bright children tended to be well adjusted, but more often in an introverted than an extroverted way. Little relationship was observed between socio-economic status and general personality adjustment.

Gann (43) compared groups of retarded readers with equated groups

of average and good readers. The Rorschach study revealed more unfavorable signs of adjustment in the personality of retarded readers than in the other two groups. Vorhaus (163) developed her thesis that non-readers are characterized by higher resistance.

In Steinzor's (152) study, the Rorschach Method distinguished between achieving and non-achieving groups of college men of high ability, the non-achieving group showing fewer signs of adjustment.

Statistically reliable personality differences between stuttering and non-stuttering children were demonstrated on the Rorschach by Krugman (83), Meltzer (94), and Richardson (122).

Goldfarb (46) compared two equated adolescent groups, one whose years of infancy had been spent in an institution, the other whose life experience had been in foster homes. Rorschach results clearly differentiated the "institution" children from the "foster home" group, the former being more passive and apathetic, less mature, less controlled, less differentiated, less ambitious, and less capable of adjustment related to conscious intention or goal. Rorschach results verified experimental and clinical findings of other studies, and in turn, could be considered verified by them. Again, equating fifteen institution children with a similar group of foster home children, Goldfarb and Klopfer (49) showed that early deprivation was associated with personality fixation on a primitive level, independent of intelligence.

In addition to the above, mentally deficient and mentally disordered groups of all kinds have been compared. A limited selection of references includes:

mental deficiency

brain-injured and non-brain-injured (Werner, 167, 168)

children of low mental development but with different school success (Abel, 2)

subnormal Negro and white institutionalized adolescents (Abel, Piotrowski, and Stone, 3)

mental disorders

neurotics (Rapaport and others, 118; Piotrowski, 111, Ross and McNaughton, 129; Koff, 81)

preschizophrenics (Rapaport and others, 118)

incipient schizophrenics (Piotrowski, 111)

paranoid conditions (Rapaport and others, 118)

obsessive adolescents (Goldfarb, 45)

patients with migraine headaches (Ross and McNaughton, 129)

Abel (2) compared two groups of subnormal girls, differentiated on the basis of academic school success. Marked differences were observed in Rorschach responses, the higher educational group showing better personality integration than the lower.

An outstanding contribution was made by Goldfarb (45) in his detailed study of twenty adolescents showing obsessional trends in terms of Rorschach patterns and qualitative aspects of the Rorschach record. Equating the obsessional adolescents with a similar group of unselected children referred for educational guidance, he identified eight reliable symptomatic

personality trends in obsessional adolescents. Rorschach results in conjunction with case study, clinical observations, interviews, and other test data enabled him to present a valuable picture of the dynamic personality structure of the obsessional adolescent.

The trend to establish "signs" which are more frequent in one group than in controlled or contrasting groups has continued in the last few years, and attempts have been made to establish statistically the extent of their diagnostic usefulness. Ross and Ross (130) combined and weighted several signs occurring more often in "neurotic" and "organic" subjects than in controls, thus obtaining a general "instability" rating and a general "disability" rating, which were validated with clinical findings and with selected subtests of the Binet. The authors reported that these ratings differentiate groups reliably.

The "sign" procedures utilized in diagnosing schizophrenia, designated as "pathognomic" and "tabular," were criticized by Piotrowski (111) because they lay insufficient stress on the systematic, dynamic, and mutual interdependency of Rorschach components.

Both Davidson (30) and Gann (43) have developed reliable batteries of "signs" for evaluating good adjustment in school children, which they applied with success in their respective studies. Piotrowski and others (114) identified specific Rorschach signs which, in the sample studied, discriminated between outstanding and non-outstanding mechanical workers.

Unfortunately the use of signs has sometimes been abused. Too often control and contrasting groups have not been utilized. Many of the "signs" require more extensive study and must be verified by application to new and larger groups.

Validation continues also in terms of studies which demonstrate a high degree of correspondence between Rorschach analyses and other criteria, such as case records, test data, teachers' reports, psychiatric diagnoses, various clinical data, and results from other projective technics; many of these studies utilize the blind-interpretation technic. Thus Schachtel (141) showed close correspondence between Rorschach records obtained from the same children at different ages and other projective data and behavior records. Munroe, Lewinsohn, and Waehner (104) showed good agreement between clinical observations and results of three projective methods, the Rorschach, graphological analysis, and art technic. Using various personality tests, including the Rorschach, Michael and Buhler (95) validated results against psychiatric diagnoses.

Again, objective validation of the method is seen in DuBois' (34) blind analyses of records of the people of Alor, which corresponded to the descriptions offered independently by the ethnographer who lived among them.

The literature is replete with individual case studies which demonstrate the close correspondence between Rorschach interpretations and validating material from non-Rorschach sources. The new manuals contain many such case studies.

Finally, studies of the method as an instrument of prediction offer probably the best method of validation. Munroe (100, 101, 102) has contributed immeasurably in this direction by her studies of Rorschach results from the freshman class at Sarah Lawrence College. The Rorschach findings were compared with independent criteria, such as academic failure, referrals to psychiatrist, and problem behavior observed by teachers. Ample evidence was reported of the high degree of success in predicting the criteria. In addition, the shock treatment studies continue to demonstrate the prognostic power of the method (Morris, 96).

Modifications and Supplementary Technics

In the last few years there have been many modifications and extensions of the Rorschach Method. Harrower-Erickson and Steiner (56) have published their manual covering both the Group procedure and the Multiple Choice Technic. As already indicated in detail (61), lack of measures of reliability, lack of adequate validating material, inadequate norms, and the generally low scientific standards of research compel us to defer judgment as to the value of the Group Method even as a screening instrument. Tho Abel (1) has reported some success with Sender's Group Rorschach Method in a vocational high school, and Stainbrook and Siegel (151) found a Group Method valuable in differentiating southern Negro and white high-school and college students, research on the Group Method has not yet followed thru to establish all phases of the method on a firm basis. Buckle and Cook described their development of the Group Method.

Studies have yielded even less promising results for the Multiple Choice Test of Harrower-Erickson and Steiner than for the Group Method (Challman, 24; Due, Wright, and Wright, 35; Balinsky, 7; Jensen and Rotter, 76; Malamud and Malamud, 91, 92; Wittson, Hunt, and Older, 172).

Experiments with self-recording technics have been suggested by St. Clair (132) and Munroe (97), who conclude that they warrant further exploration. Other supplementary tests suggested to provide additional leads as to basic personality trends include the Free Association Test described by Janis and Janis (75), based on free associations to the Rorschach blots, and the Animal Association Test by Goldfarb (48), who would study the symbolic significance of animal responses in the Rorschach. Hutt and Shor (73) have suggested extension of, and supplementary procedures for, the "testing-the-limits" phase of the Rorschach administration.

Two parallel series of blots have been proposed: the "Psychodiagnostic Inkblots" by Harrower-Erickson and Steiner (57), which are presented without adequate standardization; and the *Marseille Rorschach Mail Interview* (93), for which no research is available, to the writer's knowledge.

Scope of Application

As has been suggested, the use of the Rorschach is widespread, covering broad fields and a vast number and variety of problems in the last few

years. These have been surveyed in a recent paper by Hertz (64) on the significance of the Rorschach Method in the mental hygiene program. The application of the method in schools has been reviewed by Cowin (29), who emphasized specifically its role in clinical service, in screening those children who require study and treatment, in diagnostic study of the more seriously disturbed, in suggesting direction of treatment, and in evaluating results.

In the field of vocational guidance and counseling, application of the Rorschach has increased. Within certain areas, it has been shown to reveal specific abilities, aptitudes, and talents. Prados (115), for example, identified several common characteristics in a group of professional artists, and showed how the method could be used in studying the dynamics of artistic creativeness. The best use of the method, however, is in describing the kind of functioning personality an individual possesses, and revealing those traits of personality which help or hinder vocational adjustment. Thus Balinsky (8) was guided in his counseling in a public service employment agency by Piotrowski's (113) Rorschach formula for revealing traits of personality essential to educational and vocational success.

The method has been used in anthropological and sociological studies with interesting results. Thus, differences between Negro and white groups have been reported by Stainbrook and Siegel (151), and by Abel, Piotrowski, and Stone (3). Tulchin and Levy (162) used the Rorschach Method to obtain a better understanding of the personalities of Spanish and English refugee children. Rorschach analyses are included in anthropological studies 34, 53, and 161.

The application of the Rorschach Method in the social case-work field was considered by Schmidl (145, 146). Siegel (148, 149) described its use, by a social agency, in diagnostic procedure, in the formulation of treatment plans, and in selecting clients for group therapy and evaluating their response to it. Application of the Rorschach in a program of group therapy was also treated by Epstein and Apfeldorf (38).

The most extensive application of the Rorschach Method has been, of course, in the psychopathological area. Beck (11), Rapaport and others (118), Koff (81), Michael and Buhler (95), and many others exhibit how extensively the method is used as an aid in differential diagnosis of mental deficiency, the neuroses, the psychoses, and intraorganic pathology. Hertz (63, 64), Kamman (77), Siegel (148), and others emphasized how the method is employed as a means of rapprochement to the patient, as an aid for determining the accessibility of the patient to treatment, as a therapeutic agent since it permits the patient to find emotional release, and as a guide to the kind of treatment best fitted to the particular individual.

In passing, we may mention that the Rorschach has found use in the armed forces for research, for diagnostic purposes, and for the objective evaluation of therapeutic programs.

Conclusion

This review of published reports on the Rorschach Method indicates the progress which has been made during the last three years in systematizing research procedures, amassing scoring criteria and norms, using more scientific methods of handling data, adopting more adequate controls, employing statistical methods where they are applicable, and in applying scientific procedure to clinical validation. Today, the Rorschach represents one of the better methods for understanding the nature of personality, and is one of the more valuable instruments for use in clinical psychology.

While much progress has been made, there are still numerous problems in need of further exploration and verification. Unfortunately research has failed to keep pace with application and therapeutic usage. Standards of research have not always been kept at a high level. Dangerous trends have developed, not only in reduced emphasis on fundamental research, but in several other directions; namely, attempts to establish shorter forms of administration; attempts to over-simplify scoring and interpretation; premature utilization of group technics in advance of adequate validation; and the modification—really the emasculation—of the method to permit untrained persons to use it. These trends must, of course, be evaluated in terms of standards of wartime and of the chaotic years that followed. It is hoped that with the passing of the pressures of war and its aftermath, research will resume its former high standards, and that emphasis will again be placed on broad preparatory training in the method. The Rorschach Method cannot be effectively utilized by untrained personnel. Its efficient use requires training in the method, psychological and clinical knowledge, experience, skill, and the understanding of human problems. If workers in the field maintain high standards of research and application, the method will serve well the psychological and psychiatric needs of these postwar years.

Other Projective Technics

General Papers

The most comprehensive, recent general study of projective technics is that by Sargent (140). She critically reviewed all the existing technics, and concluded that, while projective methods are not standardized, they truly deserve increased attention and exhaustive research. White (169) recently published a general survey and bibliographical review of imaginative productions, including sections on the Rorschach, the Thematic Apperception Test, story completion, play technics, and drawing and painting procedures.

Cattell (22) published a paper dealing with the design of projective tests. His main point was that the term "projection" has been too cavalierly employed in many recent studies; and that, in consequence, the free association and fantasy elicited by several so-called "projective" technics have little connection with projective interpretation of the situation. Cat-

tell's paper should serve as a good antidote for an over-enthusiastic and lighthearted approach to the construction of projective tests.

Several papers appeared which commented on the use of different kinds of projective technics in specific clinical situations. Sarason (137) surveyed the value of projective methods in cases of mental deficiency, and reported that they served to illuminate the "total personality" instead of merely isolated intellectual aspects of functioning. Hutt (72) showed specifically how projective tests were employed in army medical installations. Holzberg (68, 69) wrote on the uses of projective technics in military clinical psychology. He warned against the limitations and dangers of projective tests when interpreted by untrained individuals, but granted their usefulness when properly employed.

Several studies also appeared which employed two or more different projective technics in an attempt to bring out valuable experimental findings. Thus Murray and Morgan (106), in a clinical study of the sentiments of Harvard students, employed numerous psychological technics, including two forms of the Thematic Apperception Test (TAT), another picture selection test, and a sentence completion test. Despert (32) employed the Duss Fable Method as well as play and drawing materials in her psychosomatic study of fifty stuttering children. Munroe (103) utilized graphological analysis, appraisal from spontaneous drawings, and the Rorschach in her special diagnostic study of one girl. Other studies were made by Munroe, Lewinsohn, and Waehner (104) and by Sanford and Cobb (133). It would seem that the multiple use of projective technics in research on personality is becoming more the rule than the exception.

Thematic Apperception Test

The Thematic Apperception Test remains (aside from the Rorschach) the most popular of the various projective technics. Considerable work was done during the past three-year period in regard to its construction, evaluation, and applications.

In the field of construction, Murray (105) brought out the third revision of the original set of thematic pictures, as well as a revised and expanded manual for its administration and scoring. Combs (26) presented his own method of analysis for the TAT in terms of situations described, goals striven for, frustrations of these goals, and action patterns used by the individual for attempted resolutions. Clark (25) devised a method of administering and evaluating the TAT in group situations, and found a substantial relationship between free responses and responses to a checklist of prepared stories. Rapaport, Gill, and Schafer (118), in the second volume of their work, reported a qualitative treatment of the TAT responses, and listed trends in responses that are diagnostically important for different kinds of clinical syndromes. Jacques (74) devised a rapid method of analyzing TAT stories, which he tested with soldiers. Lasaga y Travieso and Martinez-Arango (85) published a series of suggestions regarding the scoring and administration of the TAT, including several new technics.

Several experimental evaluations of the TAT were also reported in the literature during the three-year period under consideration. Bellak (14) designed a study in which subjects took the first five TAT pictures under normal conditions, and the second five while criticisms of their stories were being made. He concluded that "projection is in part a function of the stimulus" (14, p. 370). Loebowitz-Lennard and Riessman (89) studied factors related to the recall of TAT pictures after they had been used in the standard procedure. They found that the recall description of a picture is a condensation of the story told in response to the picture, with the principal themes brought into sharp focus. Combs (27) has studied the "validity" of interpretations of autobiography and TAT material by comparing analyses made by different judges. Agreement between two analysts was from 50 to 60 percent; agreement of an analyst with himself at a later date 63 to 68 percent. It should be realized that the comparison of interpretations of the same material may differ from the comparison of projective materials obtained in independent case studies of an individual. Sarason (136), in a study of dreams and TAT scores, found that the major themes in his subjects' dreams were generally the same as those in their TAT stories, and concluded that the validity of thematic interpretation was thereby demonstrated. Renaud (121) emphasized that fantasy is sensitive to age variations, and this must be taken into account in interpretation. Other studies evaluating the TAT were carried out by Harrison and Rotter (54) and by Kutash (84). Balken (9) summed up some of the recent studies on the TAT and found that they generally demonstrated it to be a valuable psychological technic.

Applications of the TAT to clinical work and clinical studies were fairly numerous during the period under consideration. Richardson (122) found that it failed to distinguish between stutterers and non-stutterers in many major areas of personality. Balken and Van der Veer (10), on the other hand, found it helpful in the clinical study of neurotic children. White, Tompkins, and Alper (170) reported the TAT useful in a comprehensive personality study of one subject. Sarason and Sarason (134, 135) found it very helpful in the diagnosis of feeble-minded and mentally deficient children. Kendig (79) noted its value for diagnostic purposes as well as prognosis and therapy.

In non-clinical applications, the TAT has not as yet come into wide usage. Frenkel-Brunswik and Sanford (41), however, did make an interesting sociological application of it. In their study of personality factors in anti-Semitism they found that the thematic apperceptions of anti-Semitic girls brought out the ambivalent attitudes of the girls to parental figures, and helped explain the narrow, superego-ridden personalities of these subjects. Proshansky (116) also cleverly utilized the TAT to secure scores on attitudes toward labor for two groups of subjects, and found that these scores correlated .67 and .87 with a conventional attitude scale obtained by the questionnaire method. Further experimentation along these lines would seem at present desirable.

Other Picture Projective Tests

Several other projective tests utilizing various forms of pictures have recently come into use, and experiments with them have been reported in the literature. Rosenzweig (126, 127, 128), in particular, has done a good deal of work on his Picture-Frustration Test. He has found the test to have some degree of reliability and validity, and has issued some norms and scoring samples. He freely admits, however, that the P-F Test does not reveal profound or extensive knowledge of human personality, since its modest scope limits it only to certain aspects of social adjustment. Symonds (158) has made a preliminary report of his test of forty-two pictures designed specifically for use with adolescents. He reported the pictures as differentiating on several counts between boys and girls, and between older and younger children. He concluded that the psychological themes revealed by the pictures "in a representative fashion tap the major psychological drives to be found in the fantasies of adolescents in our culture" (158, p. 328). Wekstein (166) designed and reported upon a picture test consisting of two sets of Disney-like figures, such as dwarfs, fairies, elves, nymphs, and ectomorphs. The purpose of having such innocently child-like figures, he stated, is to lull the subject into a sense of security, encourage him to identify himself with seemingly innocuous figures, and thus tap his innermost thoughts. Harrower and Grinker (55) and Chalke (23) reported validation experiments with the Harrower Stress Tolerance Test, which includes a set of pictures in some ways analogous to the TAT pictures. Goitein and Kutash (44) have published a report of the standardization on psychiatrically known populations of several unusual picture tests of projection. Leuba and Lucas (86) used a group of six pictures to investigate the effects on their subjects of three different moods—happy, critical, and anxious. They found that common sense and clinical insight are apparently correct in assigning to moods, feelings, and attitudes, a major role in the determination of intellectual processes. Raven (119) has experimented with a projective device on which a subject is confronted with a sketch of a person somewhat resembling himself and is asked a series of questions about what this hypothetical individual likes, is interested in, is afraid of, is worried about, etc. Deri (31) has described the Szondi Test, which consists of photographs (representing eight different types of mental disease) among which a subject makes a selection on the basis of liking and disliking. The evidence of the diagnostic value of this test is not at all convincing.

Play Technics

Projective play technics have continued to be employed in published researches. Howard (70) administered a play interview technic to twenty-three kindergarten and twenty fourth-grade pupils and found that the amount and quality of fantasy material spontaneously given by the children indicate that this is an effective technic for uncovering their attitudes

and interests. Bach (6) made an intensive analysis of the doll play fantasies of a group of young children, and discovered profound differences in type and amount of these fantasies to exist between boys and girls. He devised a clear-cut standardized procedure of eliciting the projective play fantasies of his young subjects, and by its use was able to qualify and classify their fantasy responses reliably and objectively. Pintler, Phillips, and Sears (110) attributed sex differences in the projective doll play of preschool children to a sex-typing process dependent on social learning during early childhood. Hay (58) studied the case of a persistently truant boy by means of projective play therapy. Sargent (138) utilized doll play with a nine-year-old boy who was presumably normal, and found him to be projecting his personal problems in the same way that so-called neurotic children do in a therapeutic session. She concluded that this supports the contention that children, of their own accord, play out their conflicts and problems. Henry and Henry (60) employed David Levy's doll play technic with twenty-four children from a primitive Pilaga South American Indian tribe. They found sibling rivalry patterns very much like those found in our own culture.

In addition to these uses of projective play technics with children, there were also a few reports, such as that by Renaud (120), of play projection employed with abnormal adults.

Drawing and Painting Technics

A good many reports have lately appeared in the literature dealing with drawing or painting as projective technics of personality measurement. Bender and Rapaport (15) collected the animal drawings of children over a number of years and reported that children who drew certain types of animals could often be placed in distinctive personality groupings. Thus, drawings of ferocious attacking animals were drawn by children with punitive fathers, who had inverted oedipus complexes. Buck (20) has experimented with the drawing of a house (H), tree (T), and person (P) as a projective device. Elksich (37) subjected the drawings of eight children to a projective analysis, and found that the drawings of three whose sociometric ratings were high gave evidences of good adjustive ability, while the drawings of three whose ratings were low, gave projective evidence of maladjustment. One other child whose sociometric rating was low gave evidence of good adjustment in the drawings; and one whose rating was medium showed maladjustment. Hellersberg (59) brought out the Horn-Hellersberg projective drawing test, in which the subjects are given guide lines from which to make drawings. Taylor (160) analyzed the free drawings of American and Indian subjects, and reported indications of the existence of cultural influences affecting behavior in the free drawing situation. Hurlock (71) studied the spontaneous drawing of adolescents and stated that these drawings reflect their interests, which are differentiated from the interests of younger children. Waehner (165), in a detailed investigation of spontaneous drawings and paintings of college

girls, noted that form-analysis of spontaneous drawings promises valuable findings in relation to understanding the inner dynamic of performance on the Rorschach.

In the area of painting, Alschuler and Hattwick (4) explored easel painting as an index of personality in preschool children, and found that while the paintings themselves may not safely be used to predict behavior, they may give possible clues to understanding the child's emotional flow and supply some of the missing clues needed to build a workable organismic personality picture. Brick (19) published a paper on the mental hygiene value of children's art work, in which she held that projective interpretation of children's paintings provides valuable material for personality study and for diagnosis of acute and deeper-seated problems. Naumberg (107), in a study of children's art expression and war, found that repetitive and stereotyped art productions diminished as boys gained confidence in themselves and in their abilities to create. She also found, in her study of the art expression of a behavior problem boy (108), that the unconscious expression of his fantasy in free art work acted as an aid in both diagnosis and therapy. Arlow and Kadis (5) published a study of finger painting in the psychotherapy of children and noted that the way in which anxiety-producing fantasy reappeared and was elaborated in the finger painting of the children was most impressive.

In the area of design, Diamond and Schmale (33) adapted the Lowenfeld mosaic test to projective interpretation, and discovered that the ability of subjects to produce spontaneously an idea for a pattern, and to execute that idea within the limits of the test materials, utilizing both color and form to produce a recognizable gestalt, correlates with and reflects the personality integration of the tested individuals.

Handwriting Technics

Graphological projective technics apparently aroused little interest in the period under consideration. The most important study was one by Pascal (109). He experimented on twenty-two college men, and had them psychologically rated on thirty-six of Murray's variables and on a good many handwriting variables. He reported that ten of the handwriting variables were shown to be significantly related to the personality variables, and contended that this conclusively established a significant relation between handwriting and personality. Considering, however, the small number of cases used, and the author's not assigning any specific handwriting characteristic to a specified personality variable, his conclusions must be taken cautiously.

Cooper (28) minced few words in censuring Eliasberg's (36) paper on "political graphology" for "its benign assumption that it fits into the framework of scientific method" (28, p. 263). In view of the paucity of objectively sustained data set forth by Eliasberg, Cooper's position in this connection is well taken.

Miscellaneous Technics

In addition to the papers recently published on the usual types of projective technics, several new procedures and applications have been brought out during the past three years.

Several story or plot completion tests have been devised and presented in the recent literature. Wolfenstein (173) administered six stories, each with an alternative realistic and unrealistic ending, to psychotic, neurotic, and normal subjects. She found that the psychotics were mainly unrealistic, while the latter two groups did not appear to differ significantly. Roody (124, 125) devised a plot completion test for purposes of analyzing a pupil's attitudes toward fictitious situations and, by implication, toward his own life problems. She reported reliabilities of .835 and .914 for her test. A study by Billingslea (17) of the Bender-Gestalt should discourage the use of this test with neurotics; its value in the study of psychotics, however, especially where there is suspicion of brain damage, is still challenging. Rotter (131) experimented with a simple method of scoring the sentence completion test, which yielded a self-reliability of .85 and an inter-scorer reliability of .89. As a measure of emotional stability it had a correlation of .61 with a psychologist's ratings of 200 patients.

Rohde (123) did some further work on the Rohde-Hildreth sentence completion technic, and found that correlations between ratings of 670 high-school students' responses in sentence completion items and the ratings of the combined judgments of their teachers, the experimenter, and other sources were .79 for the girls and .82 for the boys.

Shor (147) reports the use of a sentence completion test which he calls the SIC (self-idea-completion) Test. He interprets this test by noting areas of refusal, resistance, and recurring atypical associations.

Sargent (139) tried an experimental application of projective principles to a paper-and-pencil personality test. She presented a list of conflict situations to college students and mental hospital patients, asking them to write, in any way they wished, on the subject, "What did he do and why?" and "How did he feel?" Sargent found certain significant differences between papers written by mental patients and college students; and concluded that the results offered strong evidence that the mechanism of projection operates in a paper-and-pencil situation of the type used.

Loebowitz-Lennard and Riessman (89) propose a projective test of social attitudes consisting of true-false, multiple choice, and completion items on which the emphasis is shifted from the present to the past, from the personal to the impersonal, and from the organized to the ambiguous.

Symonds (157) studied the autobiographies of teachers in terms of projective principles, and specifically examined and discussed their need for autonomy, cognizance, and blamavoidance.

Hall (51) has attempted to validate nocturnal dreams as expressions of personality by the methods of (a) social agreement, (b) internal agreement, (c) external agreement, (d) prediction, and (e) postdiction.

Summary

The quantity and quality of the published material on projective technics for investigating personality have been sufficiently high during the past triennial period to warrant continued optimism concerning the growth and development of this lusty psychological youngster. It would certainly seem premature to celebrate the coming-of-age, or even the adolescence, of projective methods. Much remains to be accomplished in construction, evaluation, and standardization. Only the surface has been scratched in applications. But great interest in these projective technics, and a will to fight thru the problems and difficulties of a rapidly developing field, obviously exist among an increasing number of investigators. If that will persist, the way to maturity should not be too long.

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CHAPTER VII

Other Devices for Investigating Personality

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THE PRESENT CHAPTER is devoted to character tests and to other technics of personality testing not covered in the previous chapters.

Character Tests

Research on character tests has suffered, in recent years, from the lack of extensive character-testing programs. If one digs deeply enough, however, some recent literature on character testing may be unearthed. Notable among these studies is Jones' (37) comprehensive review of character development in children. Jones concluded that, while each person seems to acquire his character in conformity with the usual laws of conditioning and learning, "the possibilities for such acquisition and the broad limits thereto are provided by nature" (37, p. 747).

The main experimental project in character testing and education now in progress is that being conducted by the Schenectady University-Westminster Character Research Project. The entire issue of *Religious Education* for November-December 1944 was devoted to the findings and criticisms of this program. Ligon (42), in particular, reported on the attitude scales and questionnaires employed in the study. Among the critics of the program, Tilton (71) was especially unenthusiastic about the measurement technics being employed, and questioned their practicality.

Two new character tests have been recently reported on in the literature. Pauli (51) described a performance test used at the University of Munich that aims at disclosing character qualities which influence achievement. The test requires the subjects to do continuous addition for a sixty-minute period, and gives a "character quotient" for each individual. Pieron (53) devised an honesty-rating procedure whereby pupils are given back their own tests to mark, after these have already really been marked by their teachers; the pupils are rated on the number of changes made.

Factor analysis of character measurements began to come into more widespread use in the period under consideration. Hsu (33) took Moore's character questionnaire and found that sixteen general, and more or less primary and independent, traits could be obtained from its original fifty-seven headings. Keckeissen (39) then utilized Hsu's sixteen trait list and was able to isolate two superfactors from it, which she termed "tendency to sadness" and "emotional stability." Brogden (10), in a multiple-factor analysis of a different set of character measurements, emphasized the role of "situational" factors—i.e. factors limited mainly to a particular type of situation as contrasted with factors of greater and more intrinsic generality. These investigators used the term "character traits" in a broad sense, and dealt as much with personality as with character testing.

In the field of application, Bollinger (5), in his study of the social impact of the teacher on the pupil, used Wood's Right Conduct Test on pupils in three different schools, and found that there was a close similarity among the three schools in the scores earned on it. Jones (38) studied the honesty of 304 subjects on five character tests given twelve years apart, and found a coefficient of contingency of .37 between their adolescent and adult honesty.

Sociometric Methods

In a previous issue of this REVIEW Strang and Wollner (69) reported on a number of studies employing sociometric and allied technics. Additional studies appearing since the period covered by their review are reported here.

A test of twenty questions which directed the children in a group to choose companions and playmates for various social and other functions was described by Jastak (36). Mitchell (46) devised an interesting but subjective device that called for the selection of classmates conforming to popularly labelled and briefly described characteristics of various personality "types," such as "Alibi Ike" and "Squirrel in the Cage." More complex instruments were used by Ames (1), who modified Smalzried's Social Acceptance Scale in such a manner as to yield information with regard to both social acceptance and awareness of acceptance status. Awareness of one's social acceptance was, in the group studied, found to be limited. Jacobs (35) had seventeen girl employees express preferences concerning whom they would like to work with; he concluded that much valuable information was brought to light by this method, despite its low correlation with the findings of the Miller-Murray Personality Test.

Factors associated with mutual friendships and non-mutual relationships were investigated by Potashin (55) and by Bonney (8), both of whom employed sociometric technics along with other measures depicting intellectual and social status. Potashin compared objective characteristics (height, academic achievement, residence) with social relations as revealed in sociometric choices. She also set up and recorded an experimental interview with pairs of friends and non-friends. Bonney selected two extreme groups of "very mutual" and "very unreciprocated" pairs of elementary, secondary, and college students. In intelligence, in achievement, and in certain parts of the personality inventories which were applied, mutual friends were found to be no more alike than unreciprocative pairs.

A number of other studies were found that dealt with the characteristics of socially successful and socially unsuccessful children (Bonney, 6 and 7; Northway, 49; and Kuhlen and Lee, 41). Frankel and Potashin (27) surveyed the literature on friendships and social acceptance among children.

In a brief but penetrating analysis of two monographs on sociometric procedure (12, 48), Criswell (19) discussed critically the application of chance formulas to the interpretation of sociometric problems. Other studies of graphic, statistical, and other methodological problems related to socio-

metric procedures were made by Criswell (17, 18), Bronfenbrenner (11), and Moreno (47). The great bulk of investigations employing the sociogram were reported in *Sociometry*.

Checklists and Behavior-Rating Devices

Checklists and behavior-rating devices designed to determine social maturity, self-help, or quality of behavior were developed or further studied from preschool to adult levels. On the basis of reports of nursery school teachers in her inservice seminars, Peller (52) prepared a useful checklist of significant symptoms in the behavior of young children. This list was prepared from the point of view of dynamic psychology rather than mere habit training. Patterson (50) reported the use of the Vineland Social Maturity Scale at the Fels Research Institute, where it was applied to a group of normal children six months to ten years of age. Patterson concluded that the Vineland Scale appears to be "a reliable and fairly valid measure of an aspect of development which, at the level studied, might be called independence (in self-help), or self-sufficiency" (50, p. 286). A similar study was made by Doll (22), whose sample, however, consisted of institutionalized feeble-minded subjects. Doll (21) also reported an exploratory study of the age-trend of social maturity ratings for both normal and feeble-minded persons aged sixty-five years or over. Weitzman (75) constructed a group test of social maturity, largely in multiple-choice form, that utilized self-reported information about the subject's independence and responsibility of behavior in a variety of personal, social, and leisure activities. The test was designed for the age range of sixteen thru twenty-five. Shuey (66) studied the correlation between ratings of college students on the Wilke Personality Rating Scale by from four to fourteen college instructors; the correlation between average ratings of half the instructors with those of the other half ranged from .73 to .82 for the several traits, after application of the Spearman-Brown formula. Shuey concluded that, for adequate individual differentiation, approximately twenty raters would be required.

Tests of Mental Ability Used as Personality Tests

While the main function of a test of mental ability is usually to measure intelligence, such tests have recently been applied increasingly to the measurement of personality as well. Much of this usage stems from Wechsler's (74) claims, in the third edition of his *Measurement of Adult Intelligence*, that the Wechsler-Bellevue Scales have an appreciable diagnostic importance. According to Wechsler, such clinical groups as organic brain disease cases, psychotics, psychoneurotics, adolescent psychopaths, and mental defectives are characterized by differing performance or "scatter" on the verbal and performance scales of the Wechsler-Bellevue Test. The evidence on this point, while voluminous, is far from consistent, and sometimes leaves much to be desired in the way of appropriate control groups. The reader desiring an introduction to this literature should con-

sult the reviews by Brody (9), Mayman (45), Rabin (56, 57) and Watson (73). It appears that, at best, the various measures of "scatter" and score-pattern successfully differentiate *groups*, but are of comparatively uncertain value in the diagnosis of individuals. A special pattern of scores on the Wechsler-Bellevue Scales may be caused by several factors unrelated to psychopathy, so that caution must be exercised in using the scales diagnostically.

In the use of other tests of mental ability than the Wechsler-Bellevue for personality diagnosis, recent reports are less conflicting. Wallin and Hultsch (72) utilized the revised Stanford-Binet for such purposes and found it disappointing. On the other hand, practically all other recent reports in this connection are favorable. Brown (14) found that the revised Stanford-Binet could be employed by kindergarten teachers to throw valuable light on the personality make-up of young children. Sarason and Sarason (61), using the Kohs and revised Stanford-Binet Tests with cerebral palsied defective children, observed distinctive test-score patterns. Porteus reported that the Q-score on the Porteus Maze Test "is a useful measure in the detection of the predelinquent and the potential criminal" (54, p. 103); Wright (77) also found the Porteus Maze Test to be useful in distinguishing delinquent boys from normals. Hunt and Older (34), using a brief screening test of intelligence and vocabulary in a sample of naval recruits, found scatter to be a valuable indicator of psychopathy. For an adult clinical sample of civilians, Rapaport, Gill, and Schafer (58) found scatter patterns to be diagnostic on the Wechsler-Bellevue Scales and on the Babcock Efficiency Test; and also found a sorting test of abstraction to provide differential diagnostic indications. These authors have developed a more explicit and testable theory of the bases for patterns than have most previous writers, and have adduced considerable supporting evidence. Their studies make a forward step in a difficult field.

At least two other studies call for mention in this section. Eysenck (24), using a matrix test of intelligence, demonstrated that a normal group improved significantly more on retesting than did two neurotic groups. Goldstein (29) successfully employed the Army's Visual Classification Test to develop a key for the detection of malingering on this test.

Word-Association Tests

The resurgence of interest in word-association tests probably arises from the relation of such tests to the increasingly popular "projective" technics. Studies of word association, however, continue to be confined almost exclusively to adult, "clinical" samples, rather than ordinary educational groups. One study of a normal sample is that by McIntosh (44); he scored a free association test for contrast responses only, finding that workers whose job is to influence other people have a distinct tendency to give more contrast responses than individuals who work alone. In the clinical field, several authors have found the results of association tests to be useful for diagnostic purposes: among others, the studies by Rapaport, Gill, and

Schafer (58, 62, 63), Tendler (70), and Schnack, Shakow, and Lively (64, 65) may be mentioned. In an interesting and original report, Welch, Diethelm, and Long (76) devised an association test composed of fifteen nonsense syllables of low association value. The test has some value as a measure of "elation" in psychiatric patients, since patients in an "elated" condition give more associations to the nonsense syllables than do those in a "nonelated" or "normal" state.

Miscellaneous Tests of Personality

Tests of personality need not always be of a verbal nature; and, as usual, several reports appeared during the past three years dealing with visual, motor, or performance devices for the investigation of personality. Simon (67) published a review of Mira's form-tracing test, which he found to be a convenient, rapid method for detecting psychopathic personalities, as well as potential leaders among normal individuals. Koppe (40), in her psychosomatic study of fifty stuttering children, used the Ozertzky motor examination, and reported that it revealed marked disturbances in their motor functions. Brower (13), administering a modification of the Snoddy mirror-drawing test to forty-eight college students, found that the visuo-motor conflict induced by this test tapped certain clearly differentiated facets of personality. Louttit (43) used a mirror-tracing test on eighty-six problem men among naval personnel and on eighty-six normals, and found that it significantly differentiated the two groups. Yacorzynski and Neymann (78) gave a figure completion test involving visual and motor components to forty controls, thirty manic-depressives, and thirty schizophrenics. They found that all the differences which the manic-depressives displayed from the controls and the schizophrenics in completing the figures could be accounted for by an increase in their motor activity.

Level of aspiration and stress tests also continued to be used for personality evaluation. Gruen (30) used a level of aspiration test, with a shorthand task and symbol substitutions, in a personality study of factors in adolescence. Schnack, Shakow, and Lively (64) employed an aspiration level test in their studies of insulin and metrazol therapy. Hanawalt, Hamilton, and Morris (31) administered Frank's simple letter substitution test to college leaders and non-leaders, and found that the average level of aspiration of the former was significantly higher than that of the latter. Ego-involvement in relation to levels of aspiration was both discussed and investigated by Holt (32). Freeman (28) published detailed suggestions for a standardized "stress" test to be used for experimental purposes.

In an attempt to study personality correlates of identification with feminine role on the part of college girls in a course in psychology, Franck (26) prepared nine pairs of pictures representing sex symbols in the guise of art products. The subjects were asked to select the most "attractive" of each pair of pictures, and their selections were correlated with questionnaire data on feminine attitudes. Franck concluded that "girls preferring male symbols were more mature, i.e., accepted their role as women and

accepted men as their counterpart, while girls preferring female symbols were less mature" (26, p. 117). Steinmetz (68) gave a new twist to the use of personality inventories in an attempt to measure psychological understanding by having two persons manifesting interpersonal difficulties indicate how each other would respond to the questions of an inventory. Bennett (4) administered a test consisting of a list of sixty common annoyances to neurotic and non-neurotic hospital patients; and found that the test as a whole would have been unsuccessful in determining neuroticism in 30 percent of the patients tested. Eysenck (23) reviewed methods of measuring appreciation of humor and determined the inter-correlations of the reactions of men and women to a variety of materials of an ostensibly humorous character. A second edition of Roback's *Sense of Humor Test* (60) was published.

Finally, miscellaneous tests of personality, ranging from the most subjective to "objective" extremes, continued to be devised and experimentally employed. Anthony (2) asked Canadian school children, aged eleven and twelve, merely to rank their preference for such words as *house*, *obey*, *apple*, *song*, and *dead*; and found that, as a test of social adjustment, word-ranking is a method of promising validity. Roach (59), working with college students, experimented with a test of the "plodding" type of persistence; his battery included both performance and verbal subtests. Cattell (16) continued his work with his miniature situations tests, which he described as an "objective test of character-temperament." Buck (15) invented a "philophobe" test, which consisted essentially of a controlled interview, with the test questions to be asked orally by the examiner. Curtis and Thorne (20) also published a rapid evaluation technic which is in the controlled interview form. Eysenck (25) utilized both a dark vision and a suggestibility test for the screening of army neurotics from normal soldiers. Atterbury (3) adapted the psychodrama for diagnostic testing purposes, and reported that the first results of experimenting in this direction appeared promising.

Finally, personality is a complex, multi-faceted affair; and the instruments for the testing of personality are correspondingly diverse and numerous. Research in this field must continue to be as broad and as deep as it possibly can be. A not inconsiderable degree of progress in personality testing has been made in the last three years; but more still remains to be achieved by future workers in this field.

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CHAPTER VIII

Statistical Methods Related to Test Construction and Evaluation

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THIS REVIEW is a continuation of the survey made by Conrad (18) in the February 1944 issue of the REVIEW. Additional surveys since that time include a review by Blommers (6) of recent developments in statistics, and a survey of new computational technics by Lorge (73).

The studies reviewed in this chapter were first located by a search of *Psychological Abstracts*, *The Education Index*, *The Cumulative Book Index*, and the "Statistical Methodology Index" by Buros (9) which appears quarterly.

Texts

Most of the texts published in the period under review were, as usual, of greater expository than research interest. Of the various texts, the first volume of a proposed two-volume work by Kendall (68) requires special mention. A book by Mather (79) presents a number of mathematical methods which have been used to date largely by geneticists, but which have many possible applications in educational research.

Relations between the Characteristics of Items and of Tests

During the period covered by the present review, a number of papers appeared evaluating present technics for the selection of test items. Some of the most original of these contributions were based on the analogy between the traditional technics of psychophysics and current technics of measurement in aptitude and achievement tests. Finney (32), a statistician working in the field of agriculture, became acquainted with a paper published by Ferguson (27) in which it had been pointed out that the Müller-Urban constant process might be applied to the problem of item selection. Ferguson showed that each test item may be described first in terms of a limen, which is a measure of the point at which the item discriminates, and second, in terms of the standard deviation of the limen which is a measure of the goodness of the discrimination. Finney observed that the problem discussed by Ferguson was essentially the same as that which toxicologists encounter in the treatment of the data derived from their experiments. In the case of a test item the subject can respond either correctly or incorrectly, while in experimental toxicology the subject responds either by dying or by living. Finney showed how the methods used by the toxicologists supply a maximum likelihood solution to the problem of obtaining the best estimate of the limen and the standard deviation of the limen. The method of the toxicologist, the probit analysis method, has the advantage of providing an estimate of the stand-

ard and error of the standard deviation of the limen. The probit analysis tables used in estimating the limen and the standard deviation of the limen are published by Fisher and Yates (34). In evaluating the probit analysis method it may be said that the method is laborious but has a sounder mathematical basis than most of the methods of item analysis which are now most widely used.

Lorr (74) also published a study which started out from the analogy between the methods of psychophysics and the methods of measurement used in aptitude and achievement tests. Lorr, however, was not so much concerned with the selection of items as with the problem of scoring the test as a whole in terms of a limen. Lorr showed that an amount-limit test, which is homogeneous with respect to content but carefully graded with respect to difficulty, presents a situation similar to that which occurs when a threshold is measured by the constant method. This is a reiteration of the well-known fact that if test items are carefully graded with respect to difficulty then, under ideal circumstances, a subject would answer the items correctly up to a certain point and answer them incorrectly beyond that point. In terms of traditional psychophysical concepts, the individual could be given a score in terms of the threshold where rights change to wrongs. Since various factors obscure the precise threshold point, various mathematical devices have been devised for estimating the threshold. The threshold may be estimated by determining the raw score, by making an estimate of the point where rights change to wrongs, or by calculating a dispersion parameter from an ogive curve fitted to the data. Lorr showed that the first two methods provided measures which agree well with each other and are of approximately equal reliability. However, the dispersion parameter was found to have little relationship to the other two. This latter conclusion is particularly important because of the common practice of measuring thresholds in terms of dispersion parameters.

While the discussion of the relation of the item to the total test from the standpoint of psychophysics leads to very complex methods of item analysis if rigorous mathematical procedures are followed, practical considerations usually make such a procedure inadvisable because of the limited value of the data upon which an item analysis is based. Consequently, many workers in the field of test construction will be more concerned with minor revisions of common item analysis procedures which yield approximations. Davis (24) published a refinement of the well-known Flanagan chart in which the difficulty indices are directly comparable regardless of the number of alternative choices in the item, and in which the discrimination indices are not estimates of a Pearson correlation coefficient but functions of Fisher's z . These functions of z have the advantage of being subject to errors of measurement which are independent of the numerical values of the indices. While Davis' refinement of the Flanagan chart may be useful, it should be borne in mind that the indices of discrimination are still only estimates of the discriminating

power of the items, being based on approximately half of the available data.

A simple and practical graphic form of item analysis was presented by Turnbull (102). Turnbull's normalized graphic method provides information about each option and reveals non-rectilinear relationships between item and criterion when such are present. However, Turnbull points out that his method is valuable mainly for revising items, and should not be used when the added time required to secure detailed information is a major consideration. The method makes it possible to estimate visually the parameters which Ferguson (27) and Finney (32) were concerned with estimating with greater mathematical precision.

Gulliksen (38) and Tucker (101) published studies on the relationship between item difficulties, item validities, and the total reliability of a test. Gulliksen discussed the relation between item difficulty and inter-item correlations on the one hand and total test variance and reliability on the other. In this paper, Gulliksen pointed out that, contrary to common belief, there is no logical reason for making the variance of a test a maximum and that for practical purposes the variance of the scores on a test should be an optimum rather than a maximum. Tucker discussed the relation between true score and test score and showed that, in a 100-item test, there is a maximum correlation between true score and test score when the point correlation between items is slightly greater than 0.2. However, in this paper, as in many others that discuss the relationship between item intercorrelations and test reliability, the conclusions are based on assumptions which cannot be made when an actual test is involved. For example, in the case of Tucker's study, one assumption made is that the interitem correlations are all of the same magnitude. Since such a condition is never likely to occur in practice, considerable caution should be used in applying the conclusions drawn from the study. In this connection, it may be noted that Carroll (13) has made a careful study of the effect of difficulty and chance success on correlations between items and between tests, and Wherry and Gaylord (109) examined the relation between the factor pattern of test items and intertest correlations.

Reliability and Validity of the Test as a Whole

Guttman (43, 44) and Wherry and Gaylord (108) made analyses of the concept of test reliability. Guttman (43) made an analysis of the sources of errors in test scores and divided them into three categories, namely, trials, persons, and items. He then defined test unreliability in terms of the variations from one trial to another and showed that while unreliability so defined could not be estimated from a single trial, yet a lower limit could be established for it on that basis. Guttman (44) also applied the same analytic procedure to the estimation of the reliability of qualitative data. He showed that when a single qualitative item is tried out on a single occasion with a large population, it is possible to calculate a lower bound to the group reliability coefficient. From two

experimentally independent trials it is possible to calculate also an upper bound to the group reliability coefficient. This paper by Guttman described simple methods of calculating the lower and the upper bounds of the reliability.

Wherry and Gaylord pointed out that most methods of estimating reliability of a test assume that a single factor runs thruout all the tests items. They showed, on the basis of this assumption, that a test composed of K factors would have its reliability erroneously estimated with a ratio of $(n-K)/(n-1)$ to the true estimate. Consequently, if a test can be broken down into subtests, the Kuder-Richardson formula should not be used on the test as a whole. In such a situation the Kuder-Richardson formula should be applied to each subtest and then, by using the subtest reliability coefficients together with the intersubtest correlations, an estimate of over-all reliability can be computed. In the development of such a series of subtests it would be necessary to evaluate item validities in terms of the correlation of the item with the scores on the subtest and with the scores on the whole test. While the procedure suggested by Wherry and Gaylord is logically sound, there are relatively few situations in which it would be applicable, since most authors of tests are concerned either with the reliability of the individual subtests in their battery, or with total reliability when the material is too homogeneous to permit grouping in subtests.

Other contributions to the problem of estimating reliability include a paper by Kaitz (65) who developed, on the basis of the analysis of variance, a formula for the internal reliability of a test. Cronbach (19) proposed that tests be so devised that the odd items and the even items form strictly comparable groups with respect to content, form, difficulty, and range of difficulty, so that test reliability might be more adequately determined. Davis (22) described a method for determining the reliability coefficient of a test over a given range of ability when the reliability over a more limited or a more extended range is known. Kaitz (66) presented a discussion of the Davis paper, and additional comments were made by Martins (78).

Brogden (7), Burt (10), and Thomson (90) pointed out that tests are frequently used on populations that are either more restricted or less stricted than those used in the validation studies. Thomson discussed one aspect of this problem in a paper which outlines the necessary and sufficient conditions for using the Karl Pearson formulas for estimating the actual correlation between test results and subsequent school performance when only the tail end of the distribution is used, as happens, for example, when elementary-school children have been tested, but only those who enter secondary schools are included in subsequent studies. Both Brogden and Burt presented solutions to the converse problem of estimating the correlation between a predictor and a criterion in an unselected population when the correlation with a selected population is known.

Both McNemar (76) and Meehl (80) gave simple presentations of the problem of suppressor variables. Meehl pointed out that the selection of potential suppressor variables is primarily a psychological rather than a statistical problem. Meehl urged that a search for suppressor variables be made, tho it must be admitted that there is a lack of studies at the present time in which suppressor variables have played a major role.

Mosier (81) developed a method of estimating the reliability of a composite score from a knowledge of the weights of the components, and their dispersions and intercorrelations. According to Mosier, in order to achieve maximum reliability of a composite, it is necessary to give each component a weight proportional to the sum of the intercorrelations with the remaining components and inversely proportional to its error variance. The method is useful when, thru lack of a measurable external criterion, it is impossible to weight components directly for maximum validity.

Richardson (86) pointed out that the correlation coefficient has little meaning to the lay public as a measure of the predictive efficiency of a test. He attempted to develop a formula which would measure predictive efficiency directly in terms of the total effectiveness of the men selected. The main weakness of the suggested formula lies in the fact that it requires the use of an estimate of the ratio of the average effectiveness of the men selected to the average effectiveness of the men not selected by the test. The estimate of this ratio may be difficult to obtain and highly unreliable. Brogden (8) discussed the same problem from a more technical aspect and showed that when two variables, a predictor and a criterion, have similar frequency distributions and when the regression of the predictor on the criterion is linear, then r (rather than $1-\sqrt{1-r^2}$) may be considered to be a direct index of predictive efficiency.

Sandon (87) discussed the use of the analysis of variance for estimating the reliability of tests in large-scale programs where the scores on the tests are not objective and where the unreliability of the scoring procedure must also be estimated.

Factor Analysis

During the period covered by the present issue of the REVIEW a very large number of papers have been published on problems of factor analysis. However, most of these papers deal with minor refinements of arithmetical procedure or with short-cut methods. Few of the contributions could be described as presenting fundamental developments in the field, and in some quarters there are whispers of dissatisfaction about the large amount of energy which is being expended on mathematical details. In this connection, Ferguson (28), in reviewing the applications of mathematical techniques to psychological problems, stated with reference to factor analysis that the present tendency is for psychometrics to become a branch of statistical mathematics as such, rather than a branch of psychology.

One of the few general theoretical discussions of factor theory during the period was published by Guttman (42). This paper included an at-

tempt to give a rigorous justification of Thurstone's Centroid Method on the basis of a technic developed by Lagrange for reducing bilinear and quadratic forms. Guttman showed that Lagrange's theorem proves that the centroid method does actually reduce the rank of the Gramian matrix by unity at each stage. The paper also discusses the direct factoring of the test score matrix.

Other contributions of general theoretical interest were made by Thurstone (95) and Holzinger (49, 50). Thurstone discussed the effects of the selection of tests on the outcomes of a factor analysis, pointing out that if a given test battery shows a simple structure, then the addition of tests which are linear combinations of those in the battery will not affect the structure. Holzinger (50) demonstrated the equivalence of the centroid method and Spearman's method of factor analysis if the Spearman formulas are extended to include the communalities in the diagonal of the correlation matrix. In a separate paper, Holzinger (49) described a general procedure for obtaining a complete factor analysis of scores both when orthogonal and oblique factors are considered. One of the main objects of this latter paper of Holzinger was to point out the shortcomings of certain elementary statistical procedures. For example, the simple average, he states, is adequate only when the data are of rank one; that is to say, when only one factor is involved. To employ a simple average for summarizing data of higher rank is to summarize the data inadequately. Davis (23) developed a method for determining the reliability of each of the components resulting from a factor analysis by the principal axis method. While the method is not completely rigorous it may prove useful.

Most of the short-cut methods of factor analysis reduce the length of the mathematical procedures by introducing subjective judgment in place of rigorous calculation. For example, Thurstone (92) described a graphical method of factoring a correlation matrix. As with all graphical methods, subjective judgment plays an important part in the procedure.

Tucker (99) described a compromise between the graphical short-cut methods of factor analysis and the routine application of analytic methods. In Tucker's method, the axes for the subgroups of tests are located by analytic methods, but graphic data concerning the interrelation of factors are used in the selection of subgroups. Tucker (100) also developed a procedure for determining the successive principal components of a correlation matrix without the necessity of computing the successive tables of residual correlations.

Both Thurstone (94) and Holzinger (51) described short-cut methods of factor analysis which depend upon the grouping of tests within the battery according to their intercorrelations. In the Holzinger method, the correlation matrix is sectioned into portions, each of which has a rank of approximately unity; centroid coefficients for the variables in each section are then computed. This procedure is possible when the correlation matrix presents a structure such as a bi-factor pattern.

Additional short-cut methods were described by Thurstone (97), Zimmerman (110), and Carlson (12). Thurstone (97) described a method of rotating the axes which can be handled by a clerk. Zimmerman (110) described a simple apparatus for facilitating the graphical procedure for making orthogonal rotations of axes. Carlson (12) described a simple approximation procedure for factor analysis. It involves no inversion of signs of negative residuals, the estimations of as few communalities as there are factors, and relatively little work in the rotation of axes for arriving at meaningful results. However, this method like all other simplified factorial methods involves assumptions which do not have to be made when the longer and more orthodox procedures are used. Carlson used hypothetical data to show empirically that the results produced by his method are comparable to those derived by the centroid method. Here, as elsewhere, it must be pointed out that empirical justification based on a single instance is only circumstantial evidence in favor of a particular technic.

Davis (21) made a factorial analysis of nine tests of reading skills based on the classification by experts of a group of items. Davis made a principal axis solution which extracted as many factors as there were tests. Thurstone (98) criticized Davis' procedure on the basis that Davis had obscured the underlying factors by imposing weights on the test scores according to the judgments of authorities. Thurstone made a re-analysis of data, first by using Spearman's uni-dimensional method and then by using the centroid method, and arrived at a single factor solution with very small residuals indeed. Thurstone concluded that Davis' nine tests failed to identify the components of the complex that we call reading ability.

Lawley (71) discussed the problem of the outcomes of a factor analysis of a set of tests of unequal difficulty. He showed that a spurious factor may be introduced as a result of the differences in difficulty.

Finally, mention must be made of the following: a paper by Ullman (104), who suggested a time-saving modification of the iterative method of matrix inversion; discussions by Holzinger (52) and Thurstone (93) of second-order factors, in which the latter suggested that second-order factors may be of value in reconciling the various theories of intelligence; a paper by Kelley (67) which presented a variance-ratio test of the uniqueness of the principal-axis components as they exist at any stage of the Kelley iterative process; and a paper by Cattell (14) on cluster analysis. In this latter paper, Cattell compared the four main methods of determining the clusters in a correlation matrix, and the relative utility of factor analysis and cluster analysis. According to Cattell, cluster analysis may be used profitably as a first reduction of variables, in order to provide a brief list upon which a factor analysis may be made. In a later paper, Cattell (15) discussed methods of determining the choice of factors of rotation.

Tests of Significance

Papers devoted to tests of significance cover a wide range, from discussion of the philosophy underlying the use of such tests to the publication of tables and nomographs for use in specific situations. Simon (88) discussed the problem which arises when two experimental treatments produce statistically insignificant differences but the experimenter has to select one of the treatments. The problem is analogous to that which occurs when it is found that two tests differ insignificantly in predicting a criterion, but one of the tests must be selected.

A number of papers by Festinger (29, 30, 31) developed a series of tests of the significance of the difference between the means of two samples for cases where it is not reasonable to assume that the samples are derived from a normally distributed population. In the last of these three papers (31), the extreme case is discussed where it is desired to test the significance of the difference of the means of two samples but where it is impossible to postulate the distribution function of the parent population. In such cases, the computed level of significance will be much lower than when it is possible to postulate a definite distribution of the parent population.

Johnson and Tsao (63) presented a problem which had arisen in connection with some data on the height of boys and girls divided according to age group, in which a difficulty was encountered in making comparisons of the variability of various subgroups since both the mean height and the variability increase with age. In order to secure a valid comparison of the variabilities, it was necessary to make an allowance for the differences in the means of the groups. Johnson and Tsao developed a technic for testing the hypothesis of equality of standard deviations after adjustment for the inequality of means.

Barnard (2) described a test for homogeneity in a fourfold table in which only one set of marginal totals is fixed. Under these conditions the level of significance of an apparent departure from homogeneity is reduced. Fisher (33) criticized Barnard's test of significance and questioned its utility. In a later paper, Barnard discussed his test in relation to the problem of determining sample size. Gumbel (40) made an analysis of the sources of inaccuracy in the use of the chi-square test. In particular, the test is influenced by the choice of class interval and the practice of combining several cells at the extremes. Vajda (105) made a comprehensive survey of the measures of significance provided by chi-square for the main effects and interactions in contingency tables in which there are multiple interactions. Bancroft (1) discussed the biases in estimation that result from the use of preliminary tests of significance.

Tables and graphs designed to assist in the application of tests of significance were published by Thornton (91), Bliss (5), Fiske and Dunlap (35), Hayes (47), Lord (72), and Fisher and Yates (34). Thornton (91) published tables of coefficients of rank-difference correla-

tions that are barely significant at six different levels of significance. The levels of significance are provided for values of N from 2 up to 30. Thornton pointed out the difficulty of evaluating the significance of rank-difference correlations when they involve tie rankings. Kendall (69) provided a detailed discussion of the problems of tie rankings.

Hayes (47) pointed out that the computation of the standard error of tetrachoric correlation coefficients has been a laborious task in the past, and presented tables to assist in this procedure. Bliss (5) published a table of the chi-square distribution for degrees of freedom 1 to 30, values of p from 0.1 to 0.001, and values of chi-square from 0 to 60. Fiske and Dunlap (35) described a method of developing a graphical test of the significance of the difference between pairs of frequencies. The null hypothesis tested is that both samples are derived from the same population, and that the best estimate of the population parameter is the weighted mean proportion of the two samples. Lord (72) developed an alignment chart for calculating the fourfold correlation coefficient.

Short-Cut Methods of Treating Quantitative Data

A detailed review of recent developments in computational technics was prepared by Lorge (73). Short-cut methods of factorial analysis have already been discussed in the section of this chapter on factor analysis. Of special interest in connection with the present review are the short-cut methods which have been developed to facilitate the handling of problems of prediction from test scores. Jenkins (56) published a simple method for estimating a product-moment r . Beall (4), Butsch (11), Naylor (82), and Dwyer (26) discussed methods of facilitating multivariate analysis. Beall (4) discussed various ways of estimating the solutions of the equations necessary for solving discriminant-function problems of the type described by Fisher. Beall showed empirically that his estimates yielded results very close to those arrived at by the usual lengthy computational procedures. However, this empirical finding does not justify the use of such short-cut methods in all instances. It is quite possible that, in the data examined, a simple linear summation of scores might have resulted in almost as effective discrimination between the groups as a more elaborate and more precise technic. Here, as in other areas, generalization should not be made from a single instance.

Dwyer (26) developed a method of calculating multiple correlations which was essentially a variation of the Doolittle method. Naylor (82) developed a method of estimating multiple correlations between a criterion variable and more than two variables. The method involves the use of stereographic projection and combines a graphical procedure with certain approximate equivalences similar to those used by Kelley for a similar purpose. Butsch (11) developed a worksheet for the Johnson-Neyman technic for determining the significance of the difference between two groups of individuals on one variable, when two other variables are held constant by statistical methods.

Guttman and Cohen (45) showed that, if a battery of tests is resolved into r orthogonal common factors and n unique factors, then a series of multiple regressions can be calculated from the factor loadings. For example, it is possible to compute from the factor loadings, the regression of any one test on the remaining tests, or the regression of any one factor on the n tests. The computational procedures described might save a considerable amount of time under certain conditions.

Krathwohl (70) developed a simple graphical method whereby the achievement of different classes of students may be compared while taking into account differences in ability between the classes. Krathwohl suggested that his method might be used to evaluate the teaching ability of different instructors in an institution. However, since such data seldom, in practice, demonstrate differences between instructors, and since no test of the significance of differences is supplied, there is danger that Krathwohl's method might be misused by those who have little acquaintance with statistical problems. This danger is particularly acute since the method is presented for the use of those who cannot handle more complex technics.

Norton (84) developed a method of successive approximation for finding the departure from expectation in a complex contingency table of the type $2^n \times R$ for the purpose of calculating chi-square.

Tables and nomographs which may be of value to the psychometrician have been published by Fisher and Yates (34), Jackson and Phillips (53), Jurgensen (64), Swineford (89), and Crow (20).

In many problems of psychology and particularly those of market research, much labor can be saved if the experimenter can determine in advance the size of the sample to be examined. Swineford (89) developed tables which are useful in this connection. Nordin (83) also provided a discussion of the problem of sample size.

The tables developed by Jackson and Phillips (53) are for use in predicting success or failure from various deciles of a predictor variable. The two-way frequency tables are reported in decile units and show the expected frequencies in each cell for correlations from 0.30 to 0.95 inclusive. The tables also show the percent of successful and unsuccessful individuals in each decile for each value of r , and for failure ratios from 20 to 80 percent.

Additional contributions to the area of computational aids include a paper by Waugh and Dwyer (106) on the extension of compact methods of computing the inverse of a matrix to cases where the matrix is non-symmetrical; a discussion by Hall, Welker, and Crawford (46) on the use of tabulating machines for the extraction of factors; and a technic developed by Grossman (37) for weighting individual responses on the I.B.M. without the necessity of scoring the papers more than once. Finally, one of the oldest and simplest short-cut technics, namely the grouping of data, was carefully scrutinized by Jarrett (54), who concluded that the size of the class interval should depend on the ratio of the standard error

resulting from the grouping to the standard error of random sampling.

McNamara and Weitzman (75) showed that item analyses made by the I.B.M. Graphic Item Counter are more accurate than those made by hand and take only one-eighth the time. A second contribution on the use of the scoring machine was made by Herfindahl (48), who discussed several methods of reading standard scores directly from the scoring machine.

Applications of the Analysis of Variance

There are still relatively few papers published in the field of psychological measurement in which the analysis of variance is used as a tool to test a psychological or an educational hypothesis, or in which an experimental design is selected with a view to testing hypotheses by the analysis of variance. Sandon's paper (87) has already been reviewed in this connection. Of the five papers reviewed in this section, two are primarily concerned with experimental design, while the other three are mainly concerned with the treatment of results.

Johnson and Tsao (61) demonstrated how proper factorial design might improve the precision of a psychophysical experiment and enable the experimenter to determine both the effect of a number of factors and the effect of their interactions. The particular experiment selected for the purpose of the demonstration was that of determining the differential limen of subjects for weight increasing at a constant rate. The factorial design was of the type: 4 rates of increase x 7 weight levels x 2 sexes x 2 sights (blind or seeing) x 2 dates. The design provided considerably greater precision than the traditional design of psychophysical experiments. In a second paper by these same authors (62) an additional example was provided of the use of factorial design and of the analysis of variance in the treatment of test data.

Two papers by Cochran (16, 17) are of considerable importance in the present connection. In one of these papers (17), Cochran discussed the use of multivariate analysis for determining equivalence, linear relationship, and the relative accuracy or sensitivity of two or more scales used in the same experiment. In the second paper, Cochran (16) discussed the problem of weighting percents to take into account unequal numbers, and various criteria were suggested for deciding whether to use binomial, partial, or equal weighting procedures. Once a system of weighting had been established, Cochran provided criteria for determining whether a system of angular weighting is desirable. It may be noted that angular transformations have been used in the past as part of the analysis of variance when the data have been given in terms of percents.

The methods of analysis of variance and covariance have been developed mainly in areas in which the data are composed of equal or proportionate numbers of observations in subclasses. However, in education and psychology it is common to find unequal representation in the

subclasses of a multiple classification table. Under such conditions of disproportionate representation it is necessary to apply special mathematical methods if the analysis of variance is used. Tsao (103) described ways of handling such problems and also suggested approximate solutions.

Treatment of Qualitative Data

Guttman (41) and Wherry (107) published papers on the quantitative treatment of qualitative data. Guttman discussed the quantitative treatment of data of the type derived from public opinion polls. He pointed out that qualitative items may be scaled provided that they have "sameness" of content and that each item behaves as a simple function of scores derived from the distribution of the items. The latter condition had been fully discussed in a paper by Goodenough (36), who attempted to develop a technic for determining whether that condition could be assumed to exist.

Gulliksen (39) also discussed scaling procedures and made a careful examination of scales constructed by the classical method of paired comparisons. He showed that scales constructed by this method satisfy the broader definition of measurement, and have valuable properties not possessed by ordinal scales or by rank order scales.

McNemar (77) surveyed the current methodology of the measurement of opinions and attitudes. This survey included a critical discussion of scaling technics and of the merits of measuring opinion by means of a scale rather than by the single question. McNemar deplored the lack of work on the reliability and validity of measures of attitude.

The paper by Wherry (107) described a technic for weighting qualitative data, such as biographical material derived from questionnaires, for predicting success on an independent criterion. The method is presented with a few cautions, such as the need for cross validation (i. e., validation in a new sample). However, the chief danger inherent in such statistical technics is not mentioned, namely, that they are becoming widely used as the basis for a crudely empirical approach to psychological problems in place of the rational method of science.

Thurstone (96) presented a discussion of the central concept of measurement in situations such as the public opinion poll, the prediction of political elections, or the prediction of consumer choices. His central theorem is that if the average liking or disliking for three or more psychological objects is the same for each object, then the object for which there is the greatest range of liking and disliking is the one which will receive the largest number of first-choice votes. This concept, which Thurstone refers to as "discriminal dispersion," has important implications not only for market research but also for measurement of social attitudes.

Measures of Correlation

Johnson (57) pointed out the rather obvious but often neglected fact that errors of measurement may increase as well as reduce an estimate of

correlation, and that consequently such errors may result in an estimate of r which is numerically greater than 1.00 after the correction for attenuation has been made.

Both Jaspen (55) and Burt (10) described a coefficient of correlation which could be used when the criterion yields a threefold classification. Jaspen, however, extended his procedure so that it could be used with data classified into four or more categories.

Johnson (58, 59, 60) discussed the merits of using multiple contingency technics instead of multiple correlation technics for predicting a criterion from a number of variables. Johnson (58) enumerated the criteria that could be used in dividing a continuous variable into a dichotomy. While Johnson argued that the main advantages of multiple contingency technics are economy of time and the ease of obtaining results for inspection, it is doubtful whether these advantages fully compensate for their statistical inefficiency.

Considerable attention has been devoted in recent years to devising a statistic which would indicate the presence of a relation between successive observations. Such a statistic is widely needed in economics and could be of value in educational research. Dixon (25) developed ratio functions for testing hypotheses related to such problems of serial correlations.

Peters (85) developed a new descriptive statistic which is related to the second-order parabola in much the same way as the correlation coefficient is related to the regression coefficient. The statistic describes the general trend of the regression and the nature of its curvilinearity. However, Peters notes that for actual prediction, rather than for rough description, it is still necessary to resort to fitting a curve of the appropriate kind.

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INTRODUCTION

THIS number of the REVIEW OF EDUCATIONAL RESEARCH is the sixth to be devoted to finance and business administration. Previous issues have appeared in April of 1932, 1935, 1938, 1941, and 1944. This issue follows in a general way the plan of previous numbers, but a few changes in titles and organization of the sections have been made.

The number of chapters has been reduced to eight. Some topics appearing heretofore under one heading have been shifted to another in the belief that they logically belong under the captions where they are now placed. Two former chapters dealing with planning in finance and business administration, and the support of education have been combined to make a single chapter (Chapter I) which deals with financial planning and the support of education. This combination resulted from the fact that both the bibliographies and contents of the separate chapters overlapped to a great extent. Internal school accounting has been included in Chapter III which deals with accounting in general.

In reviewing research on transportation and school district reorganization this report is limited primarily to the financial aspects of those areas. It was felt that the other aspects were adequately treated in a preceding number (Volume 16, No. 4, October 1946) of the current cycle of the REVIEW.

In general, the review is limited to published material appearing between October 1943 and October 1946. While there was some pertinent material in the form of unpublished masters' theses and doctoral dissertations, it was felt that few of these would be available to any except specialists.

HARRY P. SMITH, *Chairman,*
Committee on Finance and Business Administration

CHAPTER I

Financial Planning and Support of Education

EUGENE S. LAWLER

THERE is evidence that school finance as a field of study has matured. In *Paths to Better Schools* (1), it was stated that problems in the field were more often recognized as associated with political theory, public finance, and economics. It was pointed out that in 1938 both the Regents' Inquiry in the State of New York and the President's Advisory Committee on Education treated school finance as a part of an integrated whole and that Burke's volume, *Defensible Spending in Public Schools*, published in 1943, continued this trend. Fowlkes (11) stressed the relationship between school finance and other public finance, and the need for modernizing existing fiscal legislation for greater efficiency.

The intimate interrelationship between education and all aspects of the culture and economy was shown in *Building a Better Southern Region* (21) where the soil, water, forest, mineral, and wild life resources, technological deficiencies, financial dependency, and the traditional attitudes, were all taken into account. Westhagen (42) showed how the deterioration of city areas and the lessening of ability to support education is due to neglect and obsolescence rather than to any necessary aging or depreciation of buildings.

The Extent of Formal Education

Hughes and Lancelot (14) compared the forty-eight states and the nations of the world as to the amount of schooling their citizens possess. They presented data from many nations showing the percent of the population six to twenty-one years of age in school. The percents for six nations were: United States, 78.5; Canada, 72.7; Russia, 66.3; Great Britain, 64.6; Germany, 59.0; and Japan, 52.2. The percents of the population eighteen to twenty-one years of age in college were: United States, 14.6; Canada, 6.2; Russia, 6.0; Great Britain, 3.6; Japan, 3.2; and Germany, 3.0. They also listed the states in order of their educational accomplishment, which they defined, in effect, as the extent to which the population attends school. Utah, Oregon, and Washington headed the list, while Alabama, Arkansas, and Mississippi closed the list, in that order. These authors reached the general conclusion that education is the decisive factor in the welfare of a people.

The Committee on Education of the U. S. Chamber of Commerce (39) showed a high correlation between years of school completed and the rental value of homes, and between the years of school completed by citizens of cities and of states, and retail sales.

Warner, Havinghurst, and Loeb (41) studied individual students in

three representative American cities, and brought out the importance of the provision of adequate opportunity for all.

The Importance of Equalization

Conant (5) showed the necessity for complete equalization of opportunity from the nursery school thru the university and professional school for the fulfilment of our national ideals, and the impossibility of its attainment under our present social and governmental organization. His conclusion was that our system of government should strive for the utmost equalization practicable.

Contrasted to the showing of the necessity of adequate educational opportunity is the showing of other studies of the enormous inequalities in the financial support of education. Norton and Lawler (30) revealed that there were 38,000 pupils in elementary schools supported at a level of \$100 per classroom unit per year, at one end of the scale, with 19,497 pupils in schools supported at a rate of \$6000, or more, per classroom unit at the other extreme, a ratio of one to sixty. Data presented for each of the forty-eight states showed that in the majority of states the schools most liberally supported received from five to ten times as much as the poorest schools.

This study revealed other highly significant data, giving the number of pupils and the number of classroom units at each level of support. While the median expenditure of all schools in the United States was \$1649 per classroom unit, there were classrooms supported at rates as low as \$100 per classroom, or less, while others were supported at a rate of \$6000, or more. Counting from the lowest 0.25 percent of classroom units to the highest 0.25 percent, they showed that the range of expenditures in the southern states having segregated schools was from \$200 to \$3600 with a median expenditure of \$1166 per classroom unit for white children. For Negro children the range was from less than \$100 to \$3300 with a median of \$477 per classroom unit. In states which did not have segregated schools the range of expenditures was from \$400 to \$5500 per classroom unit with a median of \$2199. In New York State the range was from \$800 to \$6000; in Minnesota from \$500 to \$6000; and in Utah from \$1200 to \$2200. In Mississippi the range was from \$300 to \$2200 for white children but for Negro children it was from less than \$100 to \$600.

By the use of these data it was possible for the first time to compute with some accuracy for the entire United States, as well as for individual states, the amount required to raise all the schools below any given level of support up to that specified level. It was calculated that to raise all the schools in the United States below that level up to \$600 per classroom would require \$21,000,000. To raise them all to \$1200 per classroom would require \$151,000,000; to \$1800, \$420,000,000; and to \$2400, \$799,000,000.

Lawler in the Washington Survey (35) showed that the range in equalization of expenditures of the forty-eight states extended from

Arizona, which could have achieved complete equality of expenditures in all its school districts by transferring only 3.8 percent of its total expenditures from its high expenditure districts to its low expenditure districts, to Mississippi, which would have had to transfer 34.3 percent of its expenditures to obtain the same results.

Lawler (35) also found that the percent of extra cost for small schools in rural territory varies from 3.6 in New Jersey to 88.4 in Nebraska, with a median of 20.6 for the forty-eight states.

A point that must be considered in all state support and equalization systems is the differential between the cost of high-school pupils and elementary pupils. Norton and Lawler (29) discovered that the 1930-31 average cost per high-school pupil, which was 1.7 times the average cost per elementary pupil, had changed by 1939-40 to only 1.33 times the average elementary per pupil cost. The reason for this change was twofold. In the intervening years elementary and high-school classes more nearly approximated one another in size. The high-school teacher in 1939-40 received 1.23 times as much salary as the elementary teacher rather than the previous ratio of 1.29 in 1930-31. Thome (36) found that data for Michigan agreed roughly with the national data reported by Norton and Lawler. He also secured the opinion of a large jury of experts on a series of statements relative to class size and other factors related to the differential between high-school and elementary-pupil costs. The experts' answers indicated strongly a feeling that there should be no discrimination in salary or class size between the high school and the elementary school. On the basis of this evidence Thome recommended that state aid formulas should recognize no differential between high-school and elementary grades.

Paths to Better Schools (1) demonstrated by differences in birth rates, differences in present educational status, and the mobility of population, that there must be a revision of the support for education.

Fees in Public Schools

It is sometimes forgotten that some public schools are not effectively free, even as regards tuition and supplies. Tyler's study (38) of the fee situation in Tennessee showed that in spite of an opinion of the attorney general who had declared it illegal, fees were being charged in some schools. Tyler found further that the very subjects for which fees were reportedly most often charged were not the college entrance subjects but subjects such as typewriting, home economics, agriculture, and shop—subjects most appropriate to pupils of lower socio-economic status. He discovered that in many cases these practices had a decisive effect in deterring pupils from attending school.

Reorganization of Administrative Units

The financial aspects of the reorganization of local school units was touched upon by Bingeman (3) who concluded that in the case of Lancaster County, Pennsylvania, if the size of the local unit was increased the total

amount spent on education would be increased, but the educational benefits would be increased much more proportionately. Travis (37) found that a modern centralized local tax collecting system could save the state of Pennsylvania \$4,000,000 annually, of which \$1,600,000 would be the schools' part.

Sources of Support

New taxes have been enacted for the support of state governments and schools. The *NEA Research Bulletin* (27) showed a change from twenty in 1929 to thirty-four in 1938, and to thirty-two in 1943, in the number of states using the personal income tax; a change from sixteen in 1929 to thirty-one in 1938, to thirty in 1943, in the number of states using the state corporation tax, a change from two in 1929 to twenty-three in 1938, to twenty-three in 1943, in the number of states making use of state tobacco taxes. It was found that there was a trend toward supplying aid for schools from the general funds of the state. This was in accord with the finding of Snoke (33) whose conclusion was that temporary expediency appeared to be the only justified argument to support the case of earmarked taxes.

In the case of local school units the adoption of new types of taxes is more difficult. Macy (18) reported that "the property tax must continue to be used as the chief source of funds to be raised directly by local school districts." He found further that state funds for schools should be obtained chiefly from income taxes, and that altho pressure for their use was strong, consumption taxes should be avoided.

In the field of higher education, Russell's analysis (32) showed that the largely increased revenues required must come not from endowments, or gifts, or student fees, but from governmental funds. In this same area Goldthorpe (13) showed that gifts for philanthropic purposes did not begin to approximate the amount that could be counted tax exempt under the income tax law.

Definition of Minimum Program

Some writers have not been willing to allow equalization of opportunity to depend upon the provision of a reasonable amount of support in each administrative unit. Morphet (19) advocated that each state should plan an adequate and balanced minimum program of services, and then provide sufficient finances to support the program. A similar view was expressed by Cunningham (6). The bulk of opinion has been for allowing each administrative unit wide discretion in apportioning its expenditures. It will be worth noting whether proposals such as these for greater detail of specification for minimum programs of education gain ground. An example of an equalization plan proposed which did not involve the specification of details in the minimum program was that proposed by Simpson (34). In this study an equalization plan was formulated in spite of the fact that in California state aid was tied up in the form of constitutional flat grants.

Measures of Ability To Support Education

In formulating or comparing equalization programs, it is necessary to determine how much revenue can be raised. In comparison between states Norton and Lawler (30) used income per inhabitant. Hughes and Lancelot (14) used income per child. Income, as reported by states by the U. S. Department of Commerce, will probably form the basis of the most frequently used measures in comparisons of ability among the states. This will be in spite of the fact that some states, as pointed out by Newcomer (28), have been able to shift some taxes to nonresidents. The amount of such shifting by West Virginia was slightly over \$3,000,000 per year.

Since income data are not as yet available for cities, other measures such as value of retail trade, rental value of residences, and the wage level, will be used to supplement the estimated full value of taxable property, when comparisons of ability to support education have to be made, as in the St. Paul Survey (31). Data from another measure, useful in comparing cities, the proportion of total governmental expenditures devoted to schools, for most of the larger cities of the nation were contained in the bulletin *School Expense Compared with Combined City and School Expense, 1941 and 1942* (2).

Relationship of Expenditures to Excellence of Educational Program

In the difficult area of the relationship of expenditures to the excellence of schools, the study sponsored by the Educational Conference Board of New York State (9) described the average educational programs of schools financed at \$75, \$115, and \$150 per pupil. The statistical background supporting the descriptions in this study was given by Vincent (40), who measured relative diffusion of desirable practices into schools on the three levels of support. Burke (4) analyzed the services rendered in New York schools and proposed a minimum program costing \$140 per elementary pupil and \$170 per high-school pupil.

Another incidental attack on the problem of the relationship of the excellence of an educational program and its cost was made by Jenkins (15) who showed that there was a coefficient of correlation of from minus 0.83 to minus 0.86 between the percent of draftees rejected for lack of education and intelligence, and the amount spent per pupil on public schools, whether the draftees were white or Negro.

Assessment Practices

The proper assessment of property for purposes of taxation frequently has attracted attention, as in the Washington State Survey (35). In that case, it was recommended that assessments be improved by upgrading the position of the tax assessors, and giving the state tax commission and the courts greater jurisdiction over them.

The problem of assessment in Michigan caused MacConnel (17) to work

out a formula containing the factors of assessed valuation, state equalized valuation, sale value of real property, sales tax, and motor weight tax, to measure the fiscal capacity of local units in Michigan.

Estimates of the Costs of Education

There has been planning as to what the educational system should be in the postwar years. The cost of a satisfactory program of education from nursery school thru the high school was estimated by the NEA Research Division to be \$4,592,700,000 per year (26). An estimate of the cost of the proposed high-school program was \$1,944,200,000 per year instead of the present \$800,000,000.

Federal Aid to Education

All studies examined which touched the matter recommended federal aid for education. The Educational Policies Commission (24) stated that aid for education was an obligation of the federal government and laid down several principles, some of which were: (a) that general grants were preferable to special grants; (b) that the amounts of aid should be determined on an objective basis; and (c) that any requirement that states match federal funds was undesirable because such an arrangement would favor the richer states which have ample resources to match federal funds, and would therefore be at an advantage over the states needing more aid. Such an arrangement would also tend to throw budgets out of balance in favor of the aided activity.

The Educational Policies Commission (24) came out flatly for the administration of education by the states and localities. Its recommendation can be taken as representing the almost unanimous opinion of the profession. Mort (22) reviewed the question of the separability of finance and control and came to the conclusion that there is no evidence of any necessity, or desirability, for "control to follow support" either in the relations of states to localities, or of the federal government to the states. His conclusion was that "we should not try to allocate control on some mathematical basis in terms of the relative fractions of our taxpayer dollars collected by our federal agents, our state agents, and our local agents." Morphet (20) pointed out that the one sure way to avoid federal control is to get federal aid without control. This same idea was developed by the Educational Policies Commission (25).

Lindman (16) presented a general formula to apportion federal aid among the states on a variable matching basis so that, for instance, the poorest state might receive two dollars in federal aid for each dollar it raised, while the richest state might receive only ten cents for each dollar. Such a system would have great flexibility in that no specific rate of state or local contribution would be required. On the other hand, the extreme disparities in the support of schools which have been maintained far below any reasonable level have caused many to believe that each state

should be required to keep all its schools up to some reasonable level of support in order to receive its full amount of aid.

Private and Parochial School Aid

The question of aid to private and parochial schools has been frequently raised in connection with federal aid. The Educational Policies Commission (25) took the stand that federal aid should be granted only for use in schools for which the state recognizes public funds to be available. On the other side, Wise (43) argued that the public school from which religion is excluded is a victory for the non-religious elements of the nation. He cites the experience of Scotland and other countries to show that aid to religious schools has given satisfaction. Donohue (8) stated that Catholic authorities have regarded their schools as having a right to aid from taxation, but that it has been generally recognized that the expediency of asserting this right by demanding state aid for parochial schools varied with the circumstances. Federal aid would be a new venture involving a considerable increase in taxation in those states where the Catholic population is relatively large.

Checklists and Guides

The formulation of checklists which aid in making operation more efficient can be a most useful form of research. Mulford (23) has presented the salient facts with regard to school borrowing in short compass. He made a point of the fact that school districts with good credit ratings were able to borrow funds for an interest rate of from 1 to 2 percent, of which some districts have been unaware. The volume, *Building a Better Southern Region Through Education* (21), has a list of particulars with regard to the definition of a minimum program which should be useful to those who accept the idea of a fully specified minimum program.

Public opinion is of vital importance to education, but so far education has made relatively little use of the newer opinion sampling technics. Givens (12), however, reported a study of the Denver Public Opinion Research to the effect that approximately 80 percent of American citizens were in favor of federal aid, and that 80 percent were also in favor of the states retaining control of education.

The educator has to guide or lead public opinion as well as follow it. The Florida Citizens Committee (10) has prepared a guide for use by study groups thruout the state, which goes into the financing of education as well as other aspects of organization and administration.

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CHAPTER II

Budgeting in Public Schools

HARRY P. SMITH

BURKE (6) defined a public budget as "a well conceived program of governmental action for a given period of time, with reasonably accurate plans for making the financial outlays involved and raising the necessary revenues." Good (10) defined a budget as "an estimate of proposed expenditures for a given period or purpose and the proposed means of financing them." This he followed with definitions of a number of terms used in budgetary procedure. Grose (12) described the evolution of the budget from a purely financial plan, including spending and financing, to the present concept of an educational document of which the financial document is only a part. He then gave ten principles of the educational program based on a clearly defined philosophy of education expressed in terms of definite objectives together with the means of attaining them. This he insisted should be reviewed each year and then incorporated in the budget in summary form, tho its elements should ramify every part. But it must be tempered to the known financial ability of the school district to the end that both the educational program and the financial program will be balanced. The American Association of School Administrators (1) held that the school budget is but a single phase of public budgeting. The document, the most important financial document of a school system, should be set up on both a functional and an object basis, and the requests should be reviewed in the light of unit costs.

Budget Reviews

Bolmeier (5) revealed that there are almost as many degrees of municipal fiscal control expressed in law as there are cities governed by special acts. Different interpretations upon these acts further complicate the situation. He found the courts usually holding that boards have control over specific items and reviewing bodies can cut only lump sums unless the law makes other provisions, a situation that exists in some cities. The control ranges from advisory power only, to the power legally to reduce or eliminate specific items. Controls are exercised by various bodies; e.g., the board of estimate and apportionment, the county budget commission, the county excise board, either thru direct cuts or thru their control of the tax levy. Burke (6) summarized in detail the arguments for and against fiscal dependence and then stated that the researches are inconclusive on this point. Mort (16) took the position that the review of the budget by a district meeting or by a reviewing body is an opportunity for a much broader conception of the educational program on the part of the public. He held that the democratic principle "demands broad participation of the public at large in important matters of school policy affecting the

budget or educational program." Burke insisted that fiscally independent boards must cooperate with the boards of other taxing units to maintain a proper balance.

Preparation of a Budget

Mort (16) held that the formulation of the budget demanded a far broader conception of participation by both the professional and lay groups. He stated that budgetary procedure may be highly standardized in similar school districts. Adequate budgetary procedure, he thought, will make it possible to dispense with much of the legal auditing now required. He insisted on long-term planning to insure stability and avoid sudden up's and down's. Burke (6) also stressed the long-term aspects of school budgeting. Stumpf (22) distinguished between an "appropriational" and an "estimative" budget. The former was based on the assumption that once an appropriation is included in the budget it may be expended without further consideration of its desirability. Kulp (13) appraised the present procedures of Ithaca, New York, after five years and contrasted it with their earlier work. Spears (21) suggested six principles of determining the salary budget, but insisted that studies be made to determine the ultimate effect on district finances and ability to pay. He cited a study of forty-five high-school districts in the Chicago area, only seventeen of which could follow the schedules which they had formulated.

McClintic (14) named the states that permit the creation of reserves which he considered a type of long-term budgeting. DeLong (9) described the procedure of Oil City, Pennsylvania, and McCunn and Sachs (15) insisted that a school budget is a means of achieving a program of education and indicated how to prepare and administer a budget to achieve that end. Walker (24) described the formulation of a county school budget, while Ayer (3) and Berry (4) outlined local practices. Skogsberg (20) advocated the formation of community groups to prepare cooperatively a budget which is presented to the board. He also stressed what he calls "educational atmosphere" which had a bearing on the budget. Rosentengel (18) applied the principles of budgeting to school/plant plans indicating the possible sources of revenue and nine categories of expenditures together with the proportion of the total assigned to each—a good checklist. Crawford (8) described the Ann Arbor method of budgeting educational supplies based on a five-year average. *The School Executive* (19) summarized data from twenty-five large cities indicating increasing school library appropriations.

The Administration of the Budget

Both Mort (16) and Stumpf (22) emphasized the "appropriational" type of budget which authorized specific appropriations on the basis of which the services and objects designated can be secured without additional action on the part of the appropriating body. Asfahl (2) described a simple visual device for controlling budget appropriations. Church (7)

gave reasons for variations in financial forecasting. The fiscal officer has control over some of these; e.g., negligence, "padding," lack of effort to collect taxes, activities not anticipated, clerical errors, and appropriation of same amounts year after year. But he does not control delay in state aid, payment of bills of previous years, poor economic conditions, and decrease in assessments. He secured the judgments of twenty-four specialists in public and school finance and thirty-five superintendents of third-class cities in Pennsylvania relative to the allowable errors in receipts and expenditures. The arithmetic mean of their composite judgments on the allowable error in receipts was 3 percent and in total expenditures, 2.5 percent.

Thurston and Church (23) studied the actual variations in expenditures from the budget estimates of ninety-one third-class districts in Pennsylvania. They found 52.2 percent of estimates of receipts in error by more than 20 percent, and 33.7 percent of expenditure estimates similarly in error. In fact, 48 percent of the receipt estimates and 16 percent of the expenditure estimates were in error by more than 50 percent. Fifty-nine of the fiscal officers involved reported reasons, among which, unanticipated activities, general lack of funds, improper accounting, and negligence, were cited as most important. They concluded that the budget does not control due to non-functional organization, lack of trained fiscal officers, a non-accrual accounting basis, and inadequate auditing. Grieder's (11) study of 291 Colorado school districts showed wide ranges in percents appropriated to various functions; e.g., general control, 0 to 10.1 percent; instructional service, 25.6 to 91.5 percent; plant operation, 0.8 to 28.2 percent; auxiliary services, 0 to 45.1 percent; and debt service and capital outlay, 0 to 53 percent. He concluded that generally speaking there was a lack of sound budgetary procedure which he attributed in part to a weak state department of education with little conception of education as a state function.

Reavis and Henry (17) listed the articles and books on public-school administration including several that directly concern school budgetary procedures.

General Appraisal and Needed Research

It is clearly evident that the principles of budgetary procedure are far in advance of budgetary practices if the studies of Church (7), Grieder (11), and Thurston and Church (23) may be considered as revealing fair samples of such practices. But further studies are needed involving large numbers of districts in different states. The training of fiscal officers and the relationship of this training to sound budgetary procedure merit careful study. Whether the profession has the last word in budgetary procedure as suggested by Mort (16) merits some attention. The degree in which various types of budget reviews result in a better understanding of the whole educational program is worthy of serious thought. Studies

of the technics used in estimating costs of supplies, equipment, and non-instructional services should be revealing. Finally, there should be a comprehensive study of the compliance of school executives with the specific provisions of budget statutes in the states which have enacted them.

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CHAPTER III

Accounting, Reporting, and Supply Service

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FUNDAMENTAL principles of financial accounting, reporting, and purchasing were set forth for the guidance of boards of education in *School Boards in Action* (1), the Twenty-Fourth Yearbook of the American Association of School Administrators. In this volume it was urged that school accounting, reporting, and purchasing methods be modernized, articulated, and lubricated by ample funds and trained staff so as to produce clear and accurate reports.

Financial Accounting

McCunn and Sachs (20) maintained that cost accounting, scheduling of students into classes, child accounting records, the testing program, and registration of students for employment are as essential in a well-planned, integrated accounting program as financial accounting, physical inventory, and accounting of extracurriculum activities. They discussed those phases of the Pasadena accounting program.

A modern mechanized accounting procedure for a city-school system was reported by Mueller (23). He described how it was possible to speed up payroll accounting so that all postings of bills and payrolls, transfers from inventory, as well as previous balances carried forward, could be completed by the third of the month following.

Dissatisfaction with the traditional system of classifying school expenditures for accounting was expressed by Miller (21). He suggested a new basis of classification more functional in character, designed to secure comparable data according to the following headings: administration, instruction, housing, transportation, health service, school lunches, community center service, and tuition.

Odegard (24) gave seven reasons why school districts should keep employees' compensation records: (a) provide invaluable permanent records, (b) make income tax data readily available, (c) make information for employees available at a glance, (d) help employee morale, (e) increase accuracy in payroll accounting, (f) save time, and (g) provide basis for much valuable supplementary information.

Pattington (26) recommended a system for keeping transportation records in a small school system.

Internal School Accounting

Increasing concern for the more prudent handling of student activity funds was indicated in the literature for the three-year period covered by

this review. Elsdon (8, 9, 10) analyzed procedures and practices of auditing internal school accounts in sixty cities, 100,000 or more in population. He found that thirty-three of these school systems used a centralized system of auditing, while twenty-seven used a decentralized system. On the basis of this and other findings he concluded (a) that the centralized system of auditing internal school accounts is more efficient technically, but not so good from an educational viewpoint; (b) that there is little evidence that students are participating in the auditing of internal accounts. He recommended that (a) an auditor should not participate in any way in the approval of payments, the planning of income, or the keeping of records of the accounts being audited; (b) auditors should appraise the effectiveness of existing policies and procedures for the administration of student funds; (c) the steps in audit procedure for the verification of income and receipts and for the verification of expenditures and disbursements should be carefully followed; (d) the bank accounts for student funds should be given proper identifying titles; (e) auditors should satisfy themselves that services have been rendered and materials received for which invoices have been paid during the last few days of the school year; (f) at the end of the year surpluses and deficits should be transferred to one general account in order that funds may be allocated from this fund for the benefit of any activity needing an appropriation; (g) auditors should consider a greater use of test-checks; and finally (h) the complete audit report submitted should contain a statement of cash receipts and expenditures and a balance sheet. In the appendix of his study, Elsdon (8) presented a "Manual of Instructions for the Auditing of Internal School Accounts."

Wherry (40) studied the financial management of extracurriculum activities in secondary schools in Pennsylvania with enrolments of 500 or more students. He found that (a) only a few boards of education had adopted rules and regulations for the financial management of extracurriculum funds, but that in more than one-half of the schools studied administrative officers had made such rules; (b) in more than three-fourths of the schools, students are allowed to participate in the financial management; (c) in most schools student funds are not being properly safeguarded; and (d) the larger schools use better financial procedures than the smaller schools. He made six recommendations for improving the financial management of extracurriculum funds: (a) all funds should be consolidated in the care of one official, other than the principal, who should act as treasurer of these funds; (b) for educational reasons, students should be permitted to participate in the financial organization of extracurriculum activities as student treasurers, bookkeepers, tellers, and financial secretaries; (c) there should be standardization of the types of extracurriculum funds, considered a part of the accounting system managed by the school treasurer; (d) the central treasurer should act only as the custodian and disbursing agent of extracurriculum funds, the authority to expend moneys should rest with some other official; (e) a

consolidated extracurriculum budget should be prepared for the whole school by a committee of faculty and students; (f) extracurriculum funds should be more adequately safeguarded and supervised.

The recommendations of a committee of Kansas high-school principals which made a study of school activity funds in that state were reported by Cleland (3). Seven recommended standards were given together with numerous exhibits of forms selected from the best in use in Kansas high schools. The standards dealt with surety bonds, accounting for receipts, accounting for disbursements, type of book for keeping accounts, monthly summary statements, auditing of accounts, and budgeting of accounts. It was also recommended that separate accounts be maintained for federal taxes and state taxes.

Kelly (16) and Gillespie (14) described the systems of centrally administered student activity accounts in two medium-sized city-school systems. Baxa (2), Roemer (29), and Thomasson (36) gave accounts of the operation of student banks for the handling of extracurriculum activity funds in which the students perform all the functions of a regular banking system. Roemer reported that students are supervised by a bank employee and a commercial teacher; the students receive high-school credit in banking for their work.

Reporting

Proposals for the preparation and presentation of reports were made by the National Conference on the U. S. Office of Education statistical program conducted in October 1945 (39). After reviewing the purpose and scope of the statistical program of the U. S. Office of Education, several recommendations were made which, tho directed primarily to the work of the office, apply in large measure to reporting procedures of state and local school systems. Stressing the importance of planning publications for different groups of readers, the following types of publications were suggested: (a) processed preliminary releases, with brief textual analyses, in which speed of reporting is the prime consideration; (b) popular editions of bulletins, which will be designed not for archival reference purposes, but to catch the reading interests of the general public only casually interested in education; (c) special studies of immediate interest to deliberative groups and to administrators and teachers, dealing with current problems and offering suggestions to guide practice; and (d) basic reports, for reference and further research purposes, having both current and long-time value. It was also suggested that various means of presentation in addition to printing, such as large charts, slides, and filmstrips, should be explored in the attempt to get important data before a wide audience.

A new type of report dealing with the financial operations of an institution of higher education was published by the University of Illinois (38). This bulletin, of the type suggested in (b) immediately above, presented in graphic and interesting fashion the story of how a large state

university was supported and how it spent its money for the fiscal year in question. While this type of report is not new in the field of public-school financial reporting, it marks a new development in financial reporting in institutions of higher education. Cogen (6) described the successful preparation of a similar type of financial report by the faculty treasurer of student activity funds in a Bronx high school. The report is reproduced in his article. Ullrich (37) presented a checklist for the evaluation of pictorial public-school reports. The checklist was divided into two parts: (a) mechanical make-up and (b) style, language, illustrations, and arrangement.

Supply Service

As in the past, very little research was reported on the subject of supply service during this period. It is probably reasonable, however, to surmise that some of the current practices reported were developed after research had been conducted in those school systems or areas where the reports originated. To that extent, then, some of these reports may be an indirect reflection of research.

The committee on supply and textbook management of the Southern States Work-Conference on School Administrative Problems (22) analyzed its problem as follows: (a) exploration and utilization of local, state, and regional resources in the services of school supply; (b) development of an administrative organization; (c) selection of materials; (d) procurement of instructional and custodial supplies; (e) distribution, use, and conservation of supplies; and (f) provision for fiscal information, records, and reports. In commenting on state and local relations to the supply service, the committee recommended that state functions should be supporting and supervisory, rather than controlling.

Lewis and Burns (17) emphasized that supplies must be selected in terms of educational purposes. To avoid unnecessarily high cost, the quality standard should be set at the lowest level which will meet the need effectively. These questions should also be considered: (a) Does the company have a fair service policy? (b) Has the item proved its merit? (c) Can items be bought on an open specification? (d) Is the item packaged economically? (e) Can tests and analyses be applied locally to the items? Cocking (4, 5) similarly discussed the whole problem of supply service, adding that there also must be provision for the efficient use of supplies, equipment, and furnishings. He enumerated eleven specific steps in the selection of supplies and equipment. Sawyer (31) urged the concentration of responsibility for supply service in one office. He listed as requisites of good supply service proper organization, efficient procedures, knowledge of legal relationships, close interdepartmental relationships, pleasant salesman relationships, attention to quality as well as price, expediting orders, disposing of surplus property, and efficiency in receiving, inspecting, and storing.

In a report of research concerning supply service, Pierce (27) described his normative survey, made by use of a questionnaire, in which he can-

vassed 1050 outstanding elementary-school teachers in Pennsylvania to determine (a) what supplies are essential to good teaching and (b) what quantities of these supplies are needed. Supplies were classified on a checklist as teachers' desk supplies, classroom supplies, pupils' supplies, and art supplies. Items which were checked by 75 to 100 percent of the respondents were placed in a "critical list"; those checked by 50 to 75 percent, in a "desirable list"; and those checked by less than 50 percent, in an "optional list." Using a combination of his critical and desirable lists as his basis, the author estimated that approximately two dollars per pupil should be allotted for elementary-school instructional supplies (at 1940-41 catalog prices). Among his other findings was the fact that most teachers need to buy for their own use other supplies not furnished, to the extent of an average of \$9.09 per grade teacher in towns and \$27 per rural teacher.

Pattington (25) suggested greater efficiency in planning and purchasing new equipment by "picturing" each room on paper, showing the proposed layout and location of rooms and buildings to be furnished. Davison (7), Flora (12), and Smircina (33) described purchasing systems, respectively, in a small school system, a small city system, and a large city system.

Four articles dealt with the purchasing of specific types of supplies. Farnam (11) reported on the program of food purchasing for the school cafeterias at Cleveland Heights, Ohio. She recommended the determination of need in accordance with the requirements of the particular food service, and also, the establishment of specifications or buying guides to set standards for products to be purchased. She stressed the principle that the best quality food should be bought, within the limitation of what a school can afford. A good analysis of the merits and demerits of various types of sanitary supplies for use in school buildings was presented by Seagers (32). His study would be very helpful to school custodians, purchasing agents, and building superintendents concerned with the most economical and efficient types of sanitary supplies. Textbooks are purchased under a system of competitive bidding in Chicago (30) where a Bureau of Textbooks and Building Survey administers the textbook supplies. Before bids are requested, twenty-four committees in as many subjectmatter areas evaluate and approve sample textbooks submitted by publishers. A somewhat different procedure used in another school system for selecting and adopting textbooks was described by Godwin (15). During the first months of the school year teachers study and recommend books to be replaced. Companies are then notified to submit books for consideration. During the remainder of the year committees of teachers review the books and make recommendations to the superintendent for adoption and purchase.

The Supply Inventory

The taking and maintaining of inventories received the most attention of the phases of supply management. George (13) divided into five principal operations the process of taking a school inventory: planning,

preparation, taking the inventory, pricing the inventory, and summarizing the results. Smith (34) described principles and forms used in the taking of inventories in the Baltimore system. Smith (35) explained a record system for maintaining a useful and accurate inventory in a small school system. Mattier (19) applied to the problem of keeping a permanent inventory an idea similar to that of Pattington (25), referred to above. He showed, by means of an accompanying sketch, how carefully labeled floor plans can be used with attached lists to show the name of each article, its quantity, and the unit-cost.

In Bridgeport, Connecticut, (28) the problem of maintaining a perpetual inventory of textbooks was solved by using IBM punched cards and master report sheets which recorded for each school and for each type of book the title, publisher, description of book, grade in which used, number of classes using it, number usable, number to be rebound, and the number to be discarded. This inventory, first taken about four years ago, is brought up to date periodically.

In an interesting report of a functional problem unit in elementary arithmetic, Lindquist (18) told in the words of the fourth- and fifth-grade children how they manage the supply closet for the school by filling orders, making records and reports, and checking in new supplies. This seems to be a happy combination of instruction and administration.

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CHAPTER IV

Educational Costs and Their Analysis

WAYNE W. SOPER

THE research on educational costs overlaps other phases of educational finance and business administration. In fact, most cost research is a means to an end—to secure more funds to meet costs. The revenue to meet costs is affected by economic cycles and national crises, but according to Thurston and Smith (61) the schools do not feel the upswing or the downswing of general prosperity until some time elapses and then in a modified degree. Therefore, one may expect to observe during the period for which the report is prepared some prewar, war, and postwar influences at work.

The Movement of Costs—Trends

Hubbard and Sease (29) and Fowlkes (24) studied expenditures of public schools over a seventy-year period and found the general upward trend interrupted only three times, 1870-74, 1930-34, and for the single school year 1942-43, the latter interruption being the only one during a war period. The upward trend was resumed in 1943-44 and continued into 1944-45. The Chamber of Commerce of the United States (62) presented textual and graphic material showing increased costs, particularly in states where urbanization has expanded and where income per capita is above the average. Reporting on advance statistics of state school systems *Education for Victory* (19) pointed out that costs have increased since the depression years of the thirties in spite of a decrease in the total number of children enrolled in the schools. The explanation advanced is that the number of high-school pupils continued to increase, the cost for such pupils being about 70 percent more than for elementary-school pupils. Vincent (63) summarizing the results of studies carried on by Mort and others over a period of a decade concluded that the kind, extent, and quality of educational opportunities available to pupils are directly related to the expenditure level of the schools. He did not imply that expenditure level is the only determinant of quality. The National Education Association (40) devoted one issue of its *Research Bulletin* to school expenditures in war and peace, noting that expenditures for public education were lower in 1942-43 than in any year since 1938-39. The chief cause for the decline for this particular year was an accumulative decline in expenditures for capital outlay which overbalanced the increase in current expenses. Teachers' salaries rose slightly but less than other wages.

With respect to costs of specific categories of expenditures, Soper (57) presented data on fixed charges for New York State over a period of twenty-three years showing that total fixed charges, the percent fixed charges were of current expenses, and pupil costs for fixed charges all

increased considerably during the period. The chief cause of the increase was payments for teacher retirement.

Pattington (50) traced the historical development of school transportation and presented some general data on its cost. His chief contribution, however, lies in the research he did on the cost of transportation in New York State, in which he undertook to analyze the factors affecting costs, such as size of buses, wages of drivers, equipment, storage versus school garages, insurance, cost of gasoline and oil, type of roads traveled, and amortization of cost of buses. He developed a formula for computing the probable cost of operation of a district-owned bus. Grieder (27) raised the issue of including in the school budget an appropriation for public relations in view of the increasing competition with other governmental agencies for public funds.

Comparative Costs

The following statement by Grieder (28) introduces a group of researches bearing on comparative costs: "No matter how much money were poured into schools in some communities, they could not be made to approximate in educational opportunities the schools of other communities." Woods (64) ranked the forty-eight states on (a) the need of education, (b) the ability to pay for education, (c) the respective efforts of the states to provide schools, and (d) the drawing and holding power of the high school, noting wide variations in each category. Students of state school administration would do well to study the detail of his technic and data. Givens (25) pointed out that school expenditures since 1933 have increased less rapidly than national income. In 1929, 2.8 percent of the national income was devoted to education; in 1944, only 1.5 percent. School expenditures have also lost ground in total tax collections. In 1929, 23 percent of all collections was spent for public education; in 1943, about 8 percent. He also made a comparison of expenditures for education and for certain so-called luxuries: 5.2 billions of dollars for alcoholic beverages, 2.4 billions for tobacco, 2.3 billions for education, 1.5 billions for beauty culture preparations and services. The Chamber of Commerce of the United States (62) reported that a higher level of educational expenditures was found in states with higher income brackets.

Two studies, one on a national and the other on a state basis, present much comparative data. From each of the original studies several articles have been written. The one on the state basis was under the direction of Mort, assisted by Burke, (39) for the New York State Educational Conference Board (42). The original mimeographed report is unique in many respects. Its purpose was to look at the schools from several vantage points and from data collected determine what effect local school expenditure has had on the educational program. Students of education and school officials will find the study illuminating in its procedures, sources of data, notes, and tabulations. Other states could well afford to adopt the methods used in any comprehensive study of educational funds and what they purchase

in the way of the school program. The study on the national basis is the Cooperative Study of Public School Expenditures directed by Norton (assisted by Lawler) for the American Council on Education, the National Education Association, the National Council of Chief State School Officers, the Southern States Work-Conference, and the United States Office of Education (2, 43, 48, 49). The report described shocking inequalities in the provision for education among the various states. States with least resources were making greater sacrifices than those with larger resources. The median expenditure per classroom unit varied from \$400 in Mississippi to \$4100 in New York. From the original two-volume mimeographed report data were drawn for a printed, graphic, and pictorial edition entitled "Unfinished Business in American Education" which if read and digested by school officials of the various states, should result soon in a concerted effort to erase the most glaring inequalities in our national educational picture.

Per Pupil Costs

Costs per pupil in average daily attendance have been increasing for many years. Fowlkes (24) showed that in 1880 the average expenditure per pupil for the country as a whole was \$7.91, rising steadily until in 1942 it was \$94.56. The National Education Association (31) reported the low per pupil cost by states in 1880 to be \$2.14 and the high \$29.80. By 1944 the lowest had risen to \$42.35 and the highest to \$198.49. Bagley (3) and Education for Victory (19), commenting on advance statistics released by the U. S. Office of Education, pointed out that pupil costs have continued to increase despite a decline in enrolments. The U. S. Office of Education report on pupil costs in city-school systems for 1943-44 (5) revealed that pupil costs for nearly all expenditure classifications were above those of the previous year in most of the cities. Pupil costs in cities from 1940-41 thru 1943-44 were studied and an increase in the arithmetic mean ranging from 6.2 to 44.4 percent, with an average of 16.8 percent was found. This average was below the 26.1 percent increase in the cost of living for the same period. Borchardt (6) pointed out the inequalities of educational opportunity evidenced by a per pupil expenditure ranging from \$34.60 in Mississippi to \$178.50 in New York. Vincent (63), using data of the New York State Education Conference Board report (42), showed that the proper expenditure per pupil in New York to maintain a good program averaged about \$115.

Building Costs

School building construction was halted during the war and has not been resumed to date. Considerable preparation has been made for postwar building construction which Thurston (59) reported would increase in volume for five years after resumption. The amount required to catch up in school plant construction was estimated to range from two and one-half

to nine billions of dollars (23, 59, 60). How to finance this outlay is of much concern. Cate (11), McClintic (34) and Thurston (59, 60) presented data to prove that school districts in general are in a more favorable financial position than they have been for years, because (a) indebtedness has been substantially reduced, (b) current and delinquent tax collections are above average, (c) cash on hand is large, (d) interest rates are low, and (e) state treasuries have piled up reserves. Essex (22) and Scherer (54) indicated that high costs may retard the resumption of normal building activity unless the states and the federal government participate in financing plant costs.

Higher Education

The foregoing analysis of costs dealt exclusively with public elementary and secondary education. Considerable research was also done in the field of higher education, both public and private. Russell (51) studied the trends in sources of support for higher institutions from 1880 to 1942 noting a hundredfold increase in income over the sixty-year period. He also directed the New York survey of higher education and reported at length on (a) financial resources devoted to higher education, (b) trends in the support of higher education, and (c) college costs to the student (53). Eckelberry (18) indicated that the war affected different institutions unequally, placing many in a serious condition because of high costs and decreased enrolments. Publicly controlled institutions expended 1.7 percent more and privately controlled 1 percent less in 1943-44 than in 1942-43. From 1930-44 index figures of expenditures rose from 100 to 149.

The method of computing instructional salary costs in a municipal university as reported by Baker (4) may be of interest to others wishing to make a similar study. Cain (9) and Davis (15) submitted facts on endowments and gifts showing that an all-time high for such support was reached in the early 1940's but that large philanthropies declined seriously. Earnings from endowments decreased materially due to lower rates of interest. Bond holdings declined rapidly until arrested in 1943 by large investments in government bonds.

Future financial problems of the higher institutions were studied by Alexander (1), Cowdry (13), Dozier (17), Moehlman (35), and Russell (52). Publicly supported institutions will fare better than those privately supported. Endowment earnings will continue downward; student fees will of necessity increase; more state and federal support will be required. Dozier proposed for private institutions a pre-enrolment-prepayment plan to create a backlog of students and funds.

Causes, Relationships, and Results

"If life begins at forty, education cannot dare stop at eighteen" (58) furnishes one reason why costs are higher. Adult education is rapidly becoming a part of the school program. In some states public-school funds are used for certain services to private school children (16). The cost of

living and the dollar value have changed; veterans education, feeding, and even housing school children, are part of the program (32). Davenport and Remmers (14) and Givens (25) presented data to show that education raises the level of production skill, increases human wants, which in turn demands more education. Conant (12) supported this viewpoint. If the goals outlined in the comprehensive report of the Research Division of the National Education Association (41) are to be achieved 100 percent, much larger school expenditures must be made. Boushall (8) proposed an educational use tax on employers in business and industry for the better support of education, his argument being that better education raises the standard of living and makes better business, thus enabling business to pay for better education.

Future Costs

No recent REVIEW cycle on finance has produced such a volume of future predictions and expectations as this one. Undoubtedly, the emphasis during the war on postwar planning stimulated this effort. The number of rejectees for the armed services on account of illiteracy focused attention on the inadequacy of education in some areas (33). All predictions point to higher costs. Johnston (30), Boushall (7), and Norton (44, 46) emphasized the fact that good education is good business and that it is good business to put more money into education. Education is essential for the necessary skills to maintain a high rate of production and full employment. Borchardt (6), Mort (38), and Norton (43, 45) presented data and argument that the cost of education will have to be increased considerably to erase glaring inequalities of educational opportunity both among the states and within each state. To raise every classroom unit to a \$1600 minimum alone would cost \$316,000,000.

The California Reconstruction and Reemployment Commission (10), Grace (26), Norton (47), and Thurston (61) saw the need for larger expenditures to take care of needed expansion of the educational program—nursery schools, adult education, post-secondary-school education, education of returning veterans and displaced workers. From a more philosophical viewpoint Mort (36, 38) and Smith (56) argued for good schools to shape the social pattern adequately and to undergird democracy. Education must be valued higher than in the past. Several authorities (29, 40, 55) estimated the probable annual cost of public elementary and secondary education as between 3.9 to 6 billion dollars in the postwar period, because of the unprecedented demand to catch up on plant construction, to increase teachers' salaries and to expand the program. Such expenditures would claim from 3 to 5 percent of a national income.

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CHAPTER V

Regulation of Credit to Boards of Education

WILLIAM P. McLURE

A DAY of accelerated building of schools and borrowing of money is ahead. Engelhardt (5) noted that the expansion of educational opportunities in this country is inevitable and imperative. The kind of community school needed is in the process of evolving, where school building use will not be limited to the traditional school hours. Mort (15) observed that the public may be ready to reevaluate the power of education in our national life and may come to think of a schoolhouse as contributing something more to education than mere shelter for the type of conventional school previously known. Thurston (25) reported that the public must be ready to pay considerably more than two and one-half billion dollars for school building during the period of restoration and elevation of school plant standards. Scherer (23) pointed out that the huge building program lying ahead is destined to share the limited supply of skilled labor and materials with other important projects. Heck (12) asserted recently that the time for planning is coming to an end and the time for constructing is approaching.

Present Practice of Financing School Building Programs

Flesher (7) noted that the sale of school bonds continued as the major method of financing school building programs. Grieder (9) and Flesher (7) pointed out that very little research had been done and very little had been written concerning school bonds since 1935. Grieder termed the issuance of bonds by local school districts as a poor method by which to finance capital costs. He indicated that adequate state building programs, in part financed by federal funds, could obviate this unenlightened procedure. According to Owen (20) and Oakes (19) the power of a board of education to borrow money for capital costs is acquired by legislative enactment, and the statutory provisions are strictly construed. Debt limitations imposed upon boards of education by statute are absolute and cannot be evaded by any lease and option device (20).

According to Chisholm (3) a large number of school districts in many states are now bonded heavily and cannot issue bonds within the limits of legal restrictions adequate to meet their school building needs. Rosenfield (22) found that recent court decisions were in conflict as to a school-board's authority to create local reserves for future building projects apart from specific statutes authorizing such practices. In a study of legal restrictions on financing capital outlay Peterson (21) found that districts in only a few states have been able to take advantage of their improved financial condition to set aside reserves from current income for building purposes. Lewis (13) pointed out that with heavy loads of debt service,

with shrinking assessments in cities, and with demands of operating costs, the limits of the property tax have been reached if not exceeded. This condition raises a question concerning the nature of our tax structure, and creates a need for greater state and federal assistance because of their pre-emption of the best and easiest sources of tax revenues. Essex (6) pointed out the low bond interest rates as one bright spot with respect to presentday building costs.

Trends in the Financing of Capital Costs

A review of the literature of recent years reveals a trend of thought toward financing capital outlay costs on a more scientific basis than the method of placing the burden upon the local school district.

Essex (6) reported in 1946 that thirteen states made some contributions to local school districts for school building construction, ranging from borrowing from state funds to making regular appropriations. Hamon (10) summarized important trends in this area of school finance as (a) discontinuance of financing plant programs by sinking fund bonds in most localities in favor of twenty-year serial-bond financing (short-term amortization will be even more essential if the apparent trend continues toward a less-permanent type of construction), (b) a pronounced trend toward substantial state aid for capital outlay, (c) earmarking of some reserve funds by state legislatures for special financial assistance to districts for the construction of state-approved school buildings during the early post-war period, and (d) an increasing sentiment thruout the nation for federal financial assistance for the construction of school facilities. Clapp (4) stated that a combination of local effort and outside funds on some equalization basis is needed. The American Council on Education, the National Education Association, and the American Association of School Administrators (1) stated that federal appropriations for school construction should be distributed according to two factors, (a) the proportion of the nation's educational load in each state, and (b) the relative fiscal capacity of the state.

Needed Research

Research in credit to boards of education is closely associated with the building needs and the functions buildings are to serve in the educational process. The literature on this subject during the past three years reflects widespread sentiment for research in the development of patterns of financing capital costs of current operation of schools. Fowlkes (8) suggested that the building needs of a community should be studied from ten to twenty-five years in advance of any given year. Swanson (24) emphasized the good which can come thru cooperative action of administrators, teachers, and laymen in evaluating the school facilities as a whole and planning future needs. Hamon (11) recognized the need of research for developing an objective formula for financing capital outlay and debt service upon an equalization basis. Burke (2) expressed the same need

cited by Hamon, but favored limiting the equalization basis, as has been done in New York, to satisfactory districts. Flesher (7) observed that the greatest need for research appeared to be in the areas of unit costs, the division of costs, and the interest costs of financing construction thru the sale of school bonds. Mulford (16, 17) emphasized the need for local research prior to a bond sale in the accumulation of invaluable information. In this connection he suggested a checklist of items for consideration. Peterson (21) noted that most states are desperately in need of legislation facilitating the establishment of the pay-as-you-build or the accumulate-in-advance policy, thus reducing the amount of long-term borrowing.

Morphet (14) reported the need of a plan for determining the cost of supporting a comprehensive program of education, rather than one phase of the program such as teachers' salaries. He suggested that consideration be given to the establishment of reasonable capital outlay reserves.

Norton (18) observed (a) the need for the states and localities to put into effect certain administrative and fiscal reforms which are essential to the effective financing of education, and (b) the uncertainty of the role of the federal government in the financing of education in the postwar period.

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CHAPTER VI

Relation of School District Reorganization to Finance and Business Administration

CALVIN GRIEDER

IN the last three years more interest was shown in district reorganization than during any previous comparable period. Noteworthy was the large number of investigations sponsored by state authorities, signifying a vastly increased and serious recognition of district organization as a state problem. Many reports of research at the state, county, and local levels adduced conclusive evidence on inequalities of financial resources, expenditures per pupil, and educational services. The inefficiency and wastefulness of current district administration were also indicated. Data on how reorganization could mitigate inequalities and promote efficiency and economy in the spending of school money were included in some reports in more or less detail, but generally speaking few studies showed what actually happens under reorganization. A need is apparent for more evaluative investigations like those of Cooper (12) and Cushman (13).

One more noteworthy trend besides the increased recognition of reorganization as a state problem was the growing interest in enlarged intermediate units. The best example is the progress report on the study of the intermediate unit in New York State (9), cited further below.

This chapter is limited to a review of studies which specifically dealt, at least in part, with district reorganization as it bears on finance and business administration.

General Studies

Both Morrison (37) and Elliott and Mosier (19) emphasized the need for not only more research in educational planning, but also the coordination of research by federal, state, and local agencies, including research on the allocation of control and support to the three levels of government. Rosenfield (47) showed by analysis of high court decisions that a state (subject only to its constitution) has supreme authority over education, with power to reorganize or abolish school districts and educational services in its discretion. This authority covers even a state's taking over assets of school districts without consent or compensation. Mort (40) pointed out, however, that while in legal theory district reorganization is part and parcel of state control of education, control and support are not necessarily inseparable. He argued for more careful thinking on the issues of control and support, in the light of all basic, relevant principles. Fowlkes (21) dwelt at length on the relationship of finance to local unit organization and control. He stated that a satisfactory plan of support must involve local, state, and federal participation, without stultifying local initiative.

While the problems of district reorganization, finance, and administra-

tion are largely problems of improving rural education, and most research during the period covered recognized them, specific attention was drawn to rural problems in several general studies. Butterworth (10), Dawson (14), and Norton (41) summarized the principles which should govern the organization and financing of rural education. Dawson also pointed out the inadequacies of three methods commonly used to mitigate the limitations of local district administration: (a) payment of tuition for high-school services, (b) transporting children from one district to another, and (c) superimposing high-school districts upon existing elementary-school districts. He cited earlier research of his which showed that costs are excessive in elementary and secondary schools with less than 200 and 210 enrolment respectively, and recommended larger units of administration for financial economy and improvement of regular and special services. Greene and Meadows (22) also declared that drastic reorganization of local units is demanded by, among other reasons, the excessive costs of regular and special services in small units, the complicated financial relations involved in tuition plans and overlapping districts, wasteful duplication of effort, and inadequacy of local resources.

Edwards (17) presented data showing that the rural population of the United States carries an educational load out of proportion to that carried by towns and cities, as measured by the ratio of children to adults. The situation is aggravated by the fact that farmers receive a disproportionately low share of the national income. He concluded that reorganization accompanied by both state and federal aid is essential for efficiency, economy, and equity in the education of rural children.

The remainder of this review reports the findings of statewide investigations and a few studies limited to county and local units.

County and Larger Intermediate Units Favored

Almost a dozen studies in as many different states favored the strengthening of county units of administration or larger units involving two or more counties or comparable areas. The Alabama Educational Survey Commission (49), while recommending no change in the principles of the 1935 minimum program law, stated that better use of school funds and better administration would result from unifying all districts within counties of less than 5000 population, and eventually adopting a county-unit system in the entire state. In the meantime districts should develop cooperative procedures for more effective and economical business and educational administration. The Arkansas Education Association (1), supporting its proposed initiated reorganization act, advocated reducing the state's 2179 districts to 388 by incorporating all districts with fewer than 350 enumerates into county rural districts. One of three specific advantages mentioned was more economical expenditure of school moneys. The Idaho Education Survey Commission (5) recommended reorganizing on a county or modified county basis to improve educational services and financial and administrative practices. Detailed proposals for a redefinition

and strengthening of the county superintendents' functions were made, particularly respecting business and financial administration and accounting. The Iowa School Code Commission (29) also recommended strengthening county administration.

The Kansas Legislative Council (30) sponsored statewide reorganization of the more than 7000 local units thru county committees, without, however, specifically recommending formation of county units. In Missouri (11) the enlargement of "school service areas" based on county studies was likewise urged. Englehart (20) and Vineyard (53) both set forth reorganization plans for individual counties in Missouri, whereby all local units would be united into county units. Holy (27) reported the goal of the Ohio School Survey Commission as the organization of eighty-eight county units thruout the state, excluding one hundred and thirteen city and eighty-eight village districts. County units were also recommended for South Dakota in one study made in that state (50).

A growing interest in administrative units larger than counties was manifested in a few investigations. A very detailed proposal by Butterworth (9) favored the creation of "intermediate units," to serve as operating units between the state and the local districts, with functions specifically assigned. The intermediate units, comprised of central, union, and common school districts grouped on a socio-economic basis, would provide educational, administrative, and business management services which cannot be effectively provided in the component districts. The report recommended a minimum enrolment of 5000 for such intermediate districts, subject to modification in some circumstances. In Virginia also an interest in units larger than counties was shown, in a proposal of the Virginia Education Commission (15) for combining counties into administrative units, with assistant divisional superintendents in charge of business affairs. Reusser and Wochner (46) leaned toward the county as the administrative unit in Wyoming, but also favored larger intermediate units of two or more counties with responsibility for certain functions.

County Unit Not Favored in Few Cases

A few investigators concluded that reorganization on the county basis would not be sound. The proposal for New York cited above (9) made it clear that a county unit was not recommended, altho some intermediate districts might be developed on such a base. The Kansas Legislative Council (30), while advocating reorganization thru county committees, did not specifically favor county units. Two reports categorically took the position that county units should not be formed or perpetuated. Booth (2), taking a view opposed to that expressed by the Idaho Education Survey Commission (5), concluded that the position of county superintendent was unnecessary in a reorganized state system and recommended that the position be abolished, the county recorder's office to be assigned responsibility for financial and statistical accounting, and the state education department to be assigned the supervisory functions. Kumlien (33, 34)

also differed from most students of the reorganization problem in favoring retention of local units.

Danger of Financial Policies' Freezing Undesirable Pattern of Organization

The danger of fixing on a state an unsatisfactory system of local administrative units was referred to in a number of reports. Morphet (36) warned that some state systems of financial aid in effect reward the continuance of inefficient local units as a result of failure to recognize state responsibility for assuring adequate educational standards. This danger was also noted by Norton and Lawler (42), who stated that reorganization of districts and decisions on educational services to be rendered should be solved before or concurrently with the financing plan. They held that each state must work out for itself the financial effects of reorganization, and presented illustrations for several states. Hamon (24) pointed out that a plant program geared to present local unit organization would freeze an inefficient, ineffective, and obsolete school system in many states for another generation.

Booth (2) reported that many local districts in Idaho require state subsidy in order to maintain even substandard schools, and that the state subsidy to poor districts provided by law in 1945 actually barred consolidation and perpetuated inefficient districts. The Idaho Education Survey Commission (5) frowned on allowing cooperative arrangements by basically unsatisfactory districts, a practice which retards realistic attack upon fundamentally unsound conditions. This view differs from Kumlien's position that local districts should be retained and encouraged to enter into cooperative arrangements for certain services (33, 34). The elimination of overlapping high-school and elementary districts was recommended for Kansas (32).

The Michigan Public Education Study Commission (18) reported that 95 percent of the state's 6274 districts were submarginal in character, and practically incapable of performing their functions as efficient and economical units of local government. It reported that little effort has been made to improve conditions by district reorganization, despite a relatively high level of state support, with its implication of some degree of state control. Capps (11) also found that in Missouri the law of 1931 granting aid to guarantee an eight-month school term has actually frozen local districts, and that since 1931 there has been a cessation of consolidation. The law, intended to help consolidation by providing grants of \$1000 for each abandoned school, defeated its purpose because the grant was too small and the guarantee too generous. Butterworth (9) also concluded that state aid to central school districts in New York was too small, and that the limitation of \$30,000 for any one school district included in any central district, imposed in 1943, has discouraged consolidation.

In both Illinois and Wisconsin investigators discovered that prevailing

state aid plans operated to favor retention of certain low-tax areas. Weaver (54) reported that transportation aid in Illinois without consolidation of administrative units created low-tax areas with a vested interest in preserving local districts. The Wisconsin State Education Department (55) found that districts with suspended schools and few children enjoyed a marked financial advantage over districts operating schools. The former had an average levy of 1.5 mills, while comparable operating districts had an average levy of 5.7 mills. A plan of state aid that would result in doing away with financial disadvantages for any considerable group was recommended.

Incentives to Reorganization

It is evident that many investigators in the field of district reorganization place high value on the effect of financial incentives held out by states for the attainment of improved administrative organization. For California (43) a proposal was made to include in the state aid program three types of incentives: (a) an average of \$9 more per pupil in districts with ninety-five or more pupils in average daily attendance, (b) transportation aid, and (c) aid for capital outlay. Booth (2) recommended for Idaho that reorganization of districts on fiscally and educationally sound bases be required as a prerequisite to receiving state aid, the state to be absolved from granting aid to districts not meeting standards adopted. In Kansas, a 1944 report of the legislative council (30) advocated that schools with fewer than ten pupils should not receive aid, except in isolated districts. A progress report on reorganization in that state issued in 1946 (31) stated that one of the most influential factors assisting in the reduction of one-teacher schools by 18 percent was the reducing of grants to schools of ten or fewer pupils and the augmenting of grants to larger schools.

Grants for school plant construction and transportation were frequently mentioned types of incentives in the period covered by this review. Bursch (8) cited twelve reasons for the gap between the known, necessary, and desirable school plant provisions and what is actually provided. Most of the weaknesses, he declared, are associated with archaic statutes on districting and finance. He advocated extension of state and federal support and equalization plans to include school plant construction for districts organized on approved bases. Breckner (4) reported that satisfactory district organization as a prerequisite to approval for state grants for building construction had been effective in Washington. Weaver (54) held that transportation aid would have to be substantial to induce consolidation in Illinois, and proposed that along with such aid building grants should be guaranteed where reorganization necessitated new construction. School districts should be required to meet part of the costs from a low, uniform levy, supplemented by state grants to guarantee between \$300 and \$400 per pupil for construction (based on 1939-40 cost data). The Illinois Education Association (28) reached two conclusions relative to the bearing of aid for transportation on reorganization: (a) transportation aid would

need to be increased to encourage reorganization; (b) financially weak districts would need to be guarded against heavy costs for transportation resulting from reorganization unaccompanied by aid for transportation.

Capps (11), noting the slow progress in reorganization in Missouri, recommended aid for buildings and equipment, offered by the state to satisfactory units. Transportation aid was recommended upon approval by the state education department of bus routes. Aid to enlarged districts in New York for buildings and transportation was recommended by both Butterworth (9) and Burke (7), the former proposing allocations to the proposed new-type intermediate districts. Building aid of 25 percent was urged by the Virginia Education Commission (15) to encourage the development of larger centers.

Economy and Efficiency Related to District Reorganization

The number of studies reporting in general terms on the economy and efficiency of larger administrative units was greater than the number reporting specific data on financial advantages. General treatments of financial advantages were presented in studies made in Arkansas (1), California (38, 39), Colorado (23), Illinois (28, 51), Kansas (32), Massachusetts (25), Michigan (18), Nebraska (3), Ohio (27), South Dakota (50), and Wisconsin (45). Hill (26) wrote on the economies of reorganizing city school districts. Most of the advantages mentioned related to savings effected by larger pupil-teacher ratios, large-scale buying, elimination of duplication of school facilities and transportation services, reduction of general control costs, and reduction of the cost of special services deemed essential for satisfactory schools.

Specific estimates or reports of financial economies were reported in several studies, with the qualification in some cases that the data applied only to current expenditures. Capital outlay needs created by reorganization of districts and attendance centers would in some cases require more money than could be saved by reorganization.

Butterworth (9) found that the cost of needed additional services in proposed intermediate units in New York is in inverse ratio to size of unit, ranging from \$22 per pupil in the largest units to \$48.50 in units of 1000 pupils. He recommended 5000 as a desirable minimum enrolment. In two detailed studies of larger proposed intermediate units, savings of 20 percent each were estimated for transportation, teaching costs, and purchasing. Other savings were indicated for insurance and tax collection. Burke (7) found that the point of greatest economy in New York schools was reached when elementary schools had about 400 pupils and secondary schools about 500. Breckner (4) reported that in the reorganization program of Washington wiser expenditure of funds was brought about by elimination of (a) small schools with low pupil-teacher ratio, (b) duplication of transportation routes, and (c) state subsidies to "minimum attendance districts" with fewer than fourteen pupils in average daily attendance (the last exceeding \$100,000 per year). In one county total costs were reduced

by 8 percent, while teachers' salaries were increased 14 percent. Costs other than transportation and salaries were reduced more than 50 percent. In a regional study of three counties in the Columbia Basin in the same state, Bunsa and Stonecipher (6) estimated that reorganizing the seventy-two existing districts into eighteen administrative units would effect a saving of 20 percent and simplify and reduce financial administration. In Wisconsin (55) it was estimated that a net saving from closing 1316 schools with less than twenty-two average daily attendance would have saved \$1,447,600 in 1943-44, allowing for transportation and other items associated with closing the schools.

Snyder (52) found that in one West Virginia county five years after the adoption of the county-unit plan the total outlay and per capita costs were about the same as before, but that the educational program was better than before in all aspects evaluated. Two county studies made in Missouri (20, 53) reported estimated savings of 5 percent and 10 percent in current expenditures. In the first case the reorganization of fifty districts into one administrative unit with ten attendance centers was proposed; in the other case, it was proposed to reorganize 117 districts into one unit with eleven centers.

Rural-Urban Problems of Reorganization and Finance

Besides Edwards (17) several other investigators were concerned about the distressing conditions of rural areas with respect to school finance. Butterworth (9) reported that in New York the centralized districts possess only 67 percent as much taxing power as city districts, and only 56 percent as much as village districts. Common school districts were believed to have even more meager resources. At the same time the rural areas have, as also pointed out by Edwards, a larger load of educands than city districts have. Weaver (54) demonstrated that in Illinois assessment ratios in rural areas are generally higher than in urban areas. He concluded that in enlarged districts containing both rural and urban property, tax levies apportioned on the basis of full rather than assessed valuation would relieve rural people from bearing more than their fair share of the burden of school costs. He recommended appraisal and equalization of valuations by the state tax commission in preference to county boards of review.

Lancelot (35) in a detailed study of consolidated districts in Iowa which include both farm and non-farm property found that the former pays in school taxes three times as much per pupil as the latter. He believed this fact to be the chief obstacle to reorganization in Iowa, and suggested two possible solutions: (a) differential tax rates, so that farm and non-farm property would yield the same amount per pupil (a proposal which he admitted was quite questionable); (b) a new type of district for school administration in which component farm and non-farm subdistricts would retain their identity for taxing purposes. Taking cognizance of the same problem, the Iowa School Code Commission (29) proposed a state fund to be apportioned as a credit against taxes on agricultural lands in dis-

tricts where the school tax exceeded fifteen mills. Kumlien (33, 34), working on the same problem in South Dakota, advocated retention of local units for taxing purposes, these units then to contract with larger centers for tuition and transportation.

The Kansas Legislative Council (30) brought out the fact that many urban districts are in as great financial distress as rural units, and in some cases in worse distress. This was also pointed out by the Wisconsin State Education Department (55), which reported that in 1944-45 there were 885 districts with suspended schools still finding it advantageous to retain legal status, nearly 100 of them with an average of less than one child per district. Data for Illinois (54) and Michigan (18) also proved that many rural districts find it advantageous under present laws to retain their independent status. Capps (11) reported that in Missouri 1662 rural schools were closed in 1944-45, or 31 percent of the total number in the state. Even with the duplication and inefficiency of their bus routes and other services, they could still operate at only about 68 percent of the average cost of remaining open. Bragg (3) in his investigation in four Nebraska counties concluded that the village districts bore an unfair share of the burden of education in their areas, compared with the rural districts.

Major Obstacles to Reorganization Related to Finance

Six kinds of obstacles related to school finance were reported by various investigators as barriers to reorganization. The obstacles are: (a) disposition of outstanding debt; (b) the threat of higher costs for new services and schoolhouses; (c) increased complexity and expense of transportation services as size of district is increased; (d) different assessment ratios of farm and urban property; (e) high valuation of individual local units within a proposed reorganization project; and (f) insufficient financial incentives held out by state governments. Studies dealing with one or more of these retarding factors were reported by Booth (2), Butterworth (9), Donnelly (16), Grieder (23), Kumlien (33, 34), Lancelot (35), the Michigan Public Education Study Commission (18), Weaver (54), and the Wisconsin State Education Department (55).

Only two studies of the many examined for this review lacked attention to district reorganization as an important factor in the improvement of school finance and administration. Ross' study of factors associated with Kentucky's educational level (48) is unusual for its lack of reference to district organization as one determinant of a state's educational status. The other report was issued by the Committee on Rural Community High Schools of Wisconsin (44), which included reference to many ways of improvement that were studied, tried, and recommended in a three-year program (1940-43), but gave little attention to reorganization. Two years later, however (1946), the Committee issued a final report (45) in which the deficiencies of rural elementary and secondary education were declared associated with inadequacies of district organization, financial inadequacy bringing in its train many other weaknesses.

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CHAPTER VII

The Financial Aspects of Public-School Transportation

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MUCH of the research in school transportation for the period covered in this report constitutes a recognition of the fact that school transportation is big business. An annual survey (2) in 1944 showed more children transported to and from school; fewer buses available; and longer routes, calling for greater mileage from each bus. The same source pointed out that these trends became apparent in a similar survey in 1943. As would be expected, the increased mileage resulted in a corresponding increase in cost. National figures (2, 3) show increases as high as \$10,000,000. The latest survey (3) revealed that more than 4,500,000 children were transported daily in some 92,000 vehicles at an annual cost of \$93,297,146. Miles of one-way route increased over the previous year by more than 175,000. An analysis of costs for thirteen states reporting indicated that costs for the school year 1945-46 can be expected to increase by at least 8 percent. Smaller schools (1, 6, 7, 9, 11) with less wealth per pupil than others are finding it difficult to provide transportation facilities. To correct a similar situation, a statewide study (9) of pupil transportation is now underway in Indiana to evolve a plan for the improvement of the state's financing and administration of public transportation. Interviews (1) with school officials in more than thirty counties in Idaho revealed that transportation could not be provided because of insufficient funds. The South Dakota survey (11) concluded that the problem of transportation needed further study.

State Financial Provisions

Recent enactments by state legislatures imply that the expense of transporting pupils should be included in computing the cost of the school program. Covert (5) made a survey to determine the various state provisions in providing for pupil transportation. He designed questionnaires to (a) collect information on state plans for financing this activity, and (b) formulate criteria for evaluating state programs. Returns from state departments of education showed twenty-five states authorized the use of state funds. In eleven states, transportation expense may be included in the school program; twelve states do not provide for the use of such funds. One section of the report presented a summary statement for each state showing responsibilities placed upon the state, upon the counties, and upon local districts. Authorizations were listed for pupil transportation in the order of their frequency of occurrence in state laws. The same author also proposed a list of questions that should be considered when revised plans are made for financing pupil transportation. The Michigan survey (6)

inferred that state aid for transportation contributed to the general holding power of the school; a transportation formula for state aid, developed from statistical data collected over a period of years, had encouraged economies. An analysis of county transportation costs in Idaho (1) revealed that (a) the minimum program allotment provided only one-third of the cost throughout the state and (b) in some sections the transportation allotment exceeded 50 percent of the actual cost while in others it amounted to less than 10 percent. One of the recommendations of this survey was that the state should assume full responsibility for seeing that all transportation costs up to an approved amount are met.

Ownership

The trend toward school ownership of buses, as a factor in reduced costs, is still apparent. Hutchins (8), using records made available by the ODT, reported that 80 percent of approved applications for buses were presented by school authorities and less than 20 percent by contractors. He concluded the proportion of school-owned buses may average 60 percent in 1945. However, the picture is not the same for each state. A survey in Idaho (1) revealed 51 percent of the buses were privately owned and 49 percent publicly owned. Further investigation showed that several school-owned bus systems had lower costs than counties having contract service. This source admitted there are other factors affecting costs. Of the buses used in Michigan in 1941 (6), 90 percent were owned by school districts. In South Dakota (11), higher costs were found for transportation carried on by private conveyance in the common school districts. The same source concluded that expenses would be reduced if bus transportation was extended into community school centers of the state. Hutchins (8) reminded us that research has led to the conclusion that the cost of pupil transportation in school-owned equipment is about 40 percent lower than in contracted buses. New York State surveys (10) indicated the cost of private-contract buses was 1.47 times the cost of district-owned buses.

Insurance

Strayer (12), in a West Virginia survey, revealed that during the preceding five years approximately three dollars was paid in premiums for every dollar of claims paid. Data from a questionnaire showed forty-seven counties paid \$26,722 for insurance premiums while \$8455 was returned in insurance claims. Thirty-nine counties reported claims during the prewar year 1940-41 amounted to 21 percent of premiums collected. Other findings revealed that some counties secured reduced rates thru competitive bidding and others secured reduced rates by having sufficient buses to get fleet rates. Two of the recommendations of the West Virginia survey were that the state adopt (a) a standard policy for school buses, and (b) uniform practices with regard to types and amounts of insurance to be carried. Pattington (10), reviewing insurance rates, reported that most insurance companies allowed a lower premium rate for bus fleets consisting of over

five buses, and that in general ten-twelfths of the annual premium may be secured for the ten months the school is operated. He advised school officials to read all policies carefully. One of the recommendations of the survey in Idaho (1) was that a study be made to determine whether the rates were too high.

Purchasing

There is a general need existing over the entire country for new buses to replace those now in service. A recent census (3) indicated that more than 12 percent of all school vehicles are slated for immediate replacement. Apparently there is a need for greater economy to be exercised in the purchasing of buses and transportation supplies. Strayer (12) found that prices for new vehicles of the same pupil capacity varied as much as \$2000, and vehicles of identical size as much as \$300. He called attention to various state purchasing programs which secured school buses at substantial savings. A survey (4) based on state reports submitted by a group of central rural districts in New York State showed that 50 percent purchased transportation supplies at prices higher than those provided in state contracts. In Idaho (1) individual school districts purchased their equipment from local dealers; in Michigan (6) an allowance for depreciation of school buses over a five-year period stimulated school districts to purchase their own equipment.

Salaries

Pattington (10) found a wide range in the amount of drivers' wages, ranging from \$550 to \$1200. In New York State the average advanced from \$650 per year in prewar days to the present wage of \$750. He concluded that the size of bus and the route apparently did not affect the salaries paid. Strayer (12) pointed out that the average school bus driver in West Virginia is paid \$100 to \$125 a month; school bus mechanics \$20 to \$30 more each month than the bus drivers. Results of a questionnaire on drivers' salaries in Idaho (1) showed the following median salaries: Class A districts, \$64 per month; independent districts, \$65; common districts, \$72; rural high districts, \$68.

Costs

Pattington (10) worked out a formula for estimating the cost of operating a school bus fleet. The cost is determined by allowing \$135 as a fixed item for each bus, plus \$20 times the number of seats, plus \$20 times the daily mileage of the bus. After checking the formula against figures obtained from the operation data of fifty-eight buses, he found a difference of 2 percent between the estimated cost and the actual cost. For a fleet composed of various sizes, or middle-sized buses, he concluded that the formula produced a suitable result for quickly estimating costs of operation. The same author presented a table of bus costs which were determined on the basis of the average bus built to last ten years, and

from results obtained by checking over 7000 transportation setups. He also gave a sampling of cost items based on various sized fleets with varying mileage in consolidated school districts. Much of the non-research type of literature reviewed implied that as a result of preventive maintenance during the war, buses gave safer and more dependable service for a longer period of years. Strayer (12) reported that by using ten years instead of eight years as the average life of the bus in West Virginia, the difference in annual cost would be approximately \$93,000.

Possible Economies

Strayer (12) called attention to the success of high-school students as bus drivers in North Carolina and California, and suggested that if 600, or one-half of the West Virginia drivers, were high-school pupils employed on a part-time basis for as much as \$20 per month, a saving of \$432,000 could be effected. Questionnaires sent to the schools in Idaho (1) revealed that of the schools reporting, 16 percent of all drivers were high-school pupils. North Dakota (2) worked out a "Family System" of transportation, under which nearly two-thirds of its transported pupils were carried at an average annual cost of \$24. The annual cost per child carried in buses was \$45. Pattington (10) suggested using smaller vehicles on feeder routes to ease the strain on larger buses and thus provide greater economy. Smith and Beebe (4) reporting for the Intermediate District Study in New York State, estimated that a saving of 20 percent of present transportation costs could be effected. This estimate was based on a proposed plans of transportation worked out for three areas. The same source suggested the advisability of reorganizing the transportation routes of several districts into a single unified system and pointed out that economies could result from large scale buying and servicing of a large number of buses by one organization. A county reviewing committee (1) was recommended for Idaho. Responsibilities would be to approve bus routes, determine reasonable transportation costs, make allowances for board and room in lieu of transportation, and allocate funds to county or local districts for operation and maintenance of buses.

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CHAPTER VIII

Principles of Business Administration Applied to Personnel and Other Activities

HARRY P. SMITH and JOHN B. BOUCHARD

GEE (12) recommended, after an exhaustive study of the schoolboard clerk in Ohio, the unit type of organization with the superintendent, the chief executive officer, to whom all others are subordinate. Herlinger (15) insisted that the treasurer, as custodian of funds, should be responsible *directly to the board*, but only in his custodial capacity. Thompson (51) asserted that 84 percent of school custodians are appointed by, and responsible to the local board, thus implying lack of unified administration in this area.

Principles of Personnel Management

Spalding (49) discussed the organization of school personnel in terms of three major problems and then enunciated twenty-eight basic principles involved in the administration of personnel. The Michigan Public Education Commission (10), following an exhaustive study of non-teaching personnel, recommended strongly that local boards of education adopt specific personnel policies which they should reduce to written statements. Hill (16) called attention to the change in personnel policies, and outlined an eight-point plan of personnel management which would include a careful description of each job before making appointments. The American Association of School Administrators (3) set forth five principles in dealing with employees of all types. Mattier (27) described the advisory committee of classified employees on which each group had representation. Landry (26) cited a series of basic principles relative to the organization and administration of clerical services in school systems. Akerly (1) listed a series of policies which are desirable particularly during a war period when substandard help is employed. Hynds (21) analyzed management as planning, preparation, and action, and mentioned three functions, namely, policies, procedures, and standards of performance. Elsewhere, Hynds (20) showed how the skills of the personnel engaged in plant operation and maintenance can be utilized in checking plans and specifications and in training programs. He also described a research division in plant operation and maintenance which is concerned with the solution of problems in those areas.

Types of Personnel and Duties

The National Education Association, Research Division (31) listed several types of non-teaching personnel, and the Michigan Public Education Study Commission (10) classified them into three groups—custodial, clerical, and miscellaneous—but there is still lacking a comprehensive list.

Kaiser (24) described the University of California classification and compensation plan for over 1000 non-academic positions in which 141 distinct and easily recognizable kinds of work were identified.

Custodial Group

Phay (44) studied the status of school custodial employees in sixty-four cities above 100,000 and in 181 cities between 30,000 and 100,000. He included salary schedules, working groups, hours of work, labor affiliations, and retirement. He found that 70 percent of larger cities had labor organizations, some of which had a closed shop policy. Hynds (21) argued that the qualifications, duties, management functions, and technics project school building service into the professional class. Rich (45) inventoried the personal and technical qualifications of a good janitor and gave a partial inventory of janitorial service.

Pattington (41) gave a formula for determining the number of custodians for small schools based on five factors: number of rooms, number of teachers, number of pupils, square footage of plant, and acreage in grounds. Carson (4) suggested the room equivalent as the unit of measurement. He set up room equivalents for twelve categories of activities in plant operation. Smith (48) described the method of determining the manpower requirements for the custodial care of the buildings and grounds of a large city system. Huggett (19) discussed custodial service in schools of 200 to 1000 pupils. Thompson (51) cited the trend toward more objective units of measurement of custodial work.

Hayes (14) gave five benefits from inservice training of custodians which he grouped into three categories: apprenticeship training, home study courses, and janitor-engineer courses offered by colleges and universities. Thompson (51) called attention to the trend toward inservice training which is fostered by states and by local communities in increasing numbers since its inauguration by Minneapolis. Mention was also made of the sparsity of literature in this area. The work load of many custodians was excessive in terms of hours per week and types of duties frequently required, and the equipment and methods of work have not been modernized. Phay (44) found the model work week forty-four hours.

The Michigan Public Study Commission (10) reported the average schooling of men custodians slightly above eight years with that of women two years more; the average age of men 55.16 years and of women 38.68. Not more than 12 percent had had any specific training for custodial work and that consisted of the short courses offered for custodians. Pattington (42) found that 80 percent of school custodians have had only elementary-school training and but 50 percent any technical training. Clifford (5) reported a study of some custodial employees in Michigan.

Clerical Group

Smallenburg (47) collected information concerning school clerks from thirty-three western cities ranging in population from 4000 to more than

100,000. He established standards for the number needed based on type of school and registration. Garretson and others (11) summarized the results of a questionnaire on desirable qualifications sent to school administrators in all cities of 10,000 and above. Twenty-five different traits were mentioned as desirable, together with specific training necessary and courses of study needed. Nowrey (39) pointed out the traits necessary for contacting the public properly. The Michigan Public Education Study Commission (10) reported the average schooling of school clerical workers a little in excess of twelve years and their average tenure of service relatively short.

Other Employees

Herlinger (15) studied the status, legal and otherwise, of the school treasurer in certain Pennsylvania school districts under 30,000. He determined by the jury method their proper duties and functions. Gee (12) studied intensively more than 200 schoolboard clerks in Ohio, touching their legal status, personal and social characteristics, organization of office, and their own opinions concerning office and duties. He recommended professionalization of the office with increased salary and tenure. Cromwell (8) analyzed for 301 school systems the preparation and status of school nurses.

Inservice Training

Stoy (50) traced the development of schools for custodians and summarized the types of training in such schools now operating in many states. Winkle and Parker (53) described the Kansas schools for such workers originating at the Pittsburg State Teachers College in 1927. The work, based on sixty-five jobs, was organized into definite courses. McCullough (28) described the Connecticut schools operated for custodial employees by the State Department of Education. The program had been extended to attendance officers and census enumerators in the schools, and to some other state employees. Hayes (14) stressed the practical nature of the inservice custodial courses and the economies resulting. Kersey (25) mentioned the inservice courses for certificated and classified employees as part of the wartime emphasis of the Los Angeles schools. Holubowicz (17) described the Milwaukee Engineer-Janitor's School which had been in operation five years with increased efficiency and economy. Metcalfe (29) described the use of visual material in training custodial and maintenance personnel and listed available materials. The American Automobile Association and the Trade and Industrial Service of the Vocational Division of the U. S. Office of Education (52) outlined in great detail a training course for school bus drivers.

Salaries

Murray and Thomas (30) criticized the Bureau of Labor Statistics' cost of living index as totally inadequate and established a new index based on

procedures approved by mathematicians at Columbia University and the Massachusetts Institute of Technology. As of the date of the report, they reported an increase of about 43.5 percent in living costs, with food costs up 71.9 percent; clothing, 76.8 percent; house furnishings, 63.5 percent; rents, 15 percent; fuel, electricity, and gas, 14.8 percent; and miscellaneous costs, 22.8 percent. The Research Division of the National Education Association (31, 35, 36) reported the salaries in communities from 2500 and over, paid to teachers and groups of non-teaching personnel, including nurses, attendance officers, secretaries, clerks, and custodians and others. Salary changes over a period of years were given for each group. This was supplemented by special tabulations for eighty-one cities over 100,000, and 190 cities of 30,000 to 100,000 (32, 33, 34).

Tenure and Retirement

O'Keefe (40) pointed out lack of provisions generally for retirement of non-teaching personnel, and indicated that only a few states have such provisions. He estimated that only 20 percent of non-teaching personnel was covered. Phay (44) reported only 25 percent of cities he studied as having retirement systems for custodial employees to which they contribute one-half the payments. Altmeyer (2) argued for the extension of the federal social security benefits to school employees, thus making it possible for those changing to or from school jobs to benefit. Clifford (6) discussed the advantages and disadvantages of the extension of these benefits to school employees.

Crawford (7) stressed the responsibility of administrators for securing reasonable security for teachers and other employees and listed the benefits accruing from a feeling of security.

Insurance

Joyner (22) outlined the type of analysis to be made of insurance companies by boards of education prior to the placing of insurance. He also indicated how insurance should be allocated among agents and set up eligibility requirements for their participation. Pattington (43) listed the common types of insurance needed and gave factors to be considered by a board in planning its insurance program. Holy (18) showed the ratio of losses sustained to premiums paid and concluded that commercial rates should be lowered, and also that consideration should be given to some form of state or local insurance for public-school property. He named several large cities carrying their own losses.

Joyner (23) traced the historical development of fidelity bonding, stressed the need for this type over personal bonding, and mentioned six types. On the basis of court decisions, he deduced a series of general principles applicable to this type of bonding.

Neverman (37) gave data on injuries to Wisconsin high-school athletes and described the athletic accident benefit plan in that state. In a later publication (38) the same author gave the experience of the plan and

described its extension to all public-school pupils in the state while in school except while being transported. Elicker (9) described a plan operative in the New England states for the benefit of high-school pupils incurring injuries in athletics. Grubbs (13) described the plan in operation in a community in which the local physicians, dentists, and hospitals cooperate.

Real Estate Management

Rosenfield (46) reported a series of court decisions involving the reversion clauses of deeds conveying land to school districts for school purposes and stressed the need of careful examination of school deeds.

Needed Research

There is evidence of increasing interest in, and concern for, the non-teaching personnel; but far too little is known about the qualifications, personal and technical, for the non-teaching jobs. The University of California Study (24) is indicative of the type of research needed. What are the jobs? What duties and activities does each involve? What personal qualifications are necessary? What technical preparation is necessary? What inservice training programs are desirable? What compensation is required to secure and hold competent persons? Tenure and financial security are essential for the non-teaching as well as for the teaching personnel and should be studied intensively. Finally, personnel policies are imperative in this area and should be formulated on the basis of extensive research.

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CHAPTER IX

The Direction of Movement in Finance and Business Administration

WAYNE W. SOPER

As was noted in Chapter I, school finance seems to be coming of age. While one might expect, in view of this more mature status, that research in educational finance will have improved markedly as time has passed, this change is not clearly observable. There is still much immature effort. Researches too frequently are poorly planned, hastily performed, and incorrectly interpreted.

As was true in the previous three-year period (1941-44), financial planning has occupied the major energies of administrators and researchers. Shortages of materials have prevented the revival of school building construction without which many other educational developments cannot become effective.

Financial Planning and Support of Education

Evidence of the gross inequalities in the financial support of education keeps accumulating and the correlative necessity for equalization of educational opportunity thru state and federal support has continued to accumulate. The base of application of state and federal support is widening to include not only elementary and secondary education but nursery schooling at one end and higher education at the other. The bogey of federal control still haunts the minds of some writers.

An important outcome of at least one study was a discovery of the narrowing of the gap between cost of elementary and high-school education. This was due to two trends: (a) increased high-school enrolments and (b) a movement toward the single salary scale.

The battle for free schools was supposed to have been won in the previous century, but studies showed that textbooks and school supplies are charged to pupils in some localities and even fees are charged for certain courses.

To raise additional funds for educational purposes, new tax sources are being tapped and certain state tax sources—income tax, corporation tax, tobacco tax—are spreading. The trend of supplying state aid from the general funds of the states continues. Evidence continues to accumulate to the effect that good schools cost much money and that the best schools expend the most per child. The question of state and federal aid to private and parochial schools is still unanswered to the satisfaction of all parties.

Budgeting and Accounting

Budgeting in public schools is still groping for solutions to its many problems. Theory is far ahead of practice. The fault may be in piecemeal, sporadic research, the cure for which would involve surveys of a statewide

or nationwide nature. Some difficulty may be caused by lack of agreement on definitions. A budget is one thing to the theorist, another to the administrator. Research may find the answer but research must wait for better training of fiscal officers to practice what the best procedure preaches. Further study of the technics used in estimating the cost of supplies, equipment, and non-instructional services is needed.

In the field of accounting, reporting, and supply service a few new problems were touched upon. Registration of students for employment was deemed essential in a well-planned accounting program. Employee compensation records would provide necessary data for income tax returns as well as for accurate payroll accounting. It was proposed that students have a part in managing student activity funds. Further research in this field is indicated to establish sound policies, workable procedures, and accurate accounting.

The research on reporting centered attention on the methods of acquainting the public with the schools' activities, suggesting different types of reports for different purposes: (a) preliminary releases, (b) popular editions of bulletins, (c) special studies of immediate interest, (d) basic reports for reference and further research.

Costs of Public Education

Except for the school year 1942-43 total expenditures for public elementary and secondary education continued their upward trend in spite of decreased enrolments. The chief cause of the 1942-43 decline was the cumulative effect of lower capital outlay costs during the war years overbalancing the increase in current expenses. From a comparative viewpoint school costs lagged further behind national income and total tax collections than for a decade. Pupil costs in average daily attendance were still increasing due largely to a decline in average daily attendance. Considerable research was reported on the costs of higher education, both public and private, revealing higher costs, most of which fell on students in the shape of tuition increases.

Why are costs higher? The answer is multiple: expanded services, such as adult education, transportation of pupils, feeding of school children; lower dollar values; higher salaries for personnel, both teaching and non-teaching. Will costs decrease? The answer is no; all predictions point to higher costs. Some writers have stated that it is good business to put more money into education; that education is essential to maintain a high rate of production and full employment. Further expansion of school services is predicted: more nursery schools, adult education, post-secondary education, education of veterans and displaced workers.

Capital Outlays and Regulation of Credit

Regulation of credit to boards of education is confined almost exclusively to school building financing. This credit must be expanded in the near future to take up the slack occasioned by wartime cessation of building.

Planning must soon give way to construction. Until state and federal funds are available for a continuous school building program the issuance of bonds will constitute the chief source of funds for capital costs. Sinking fund bonds are giving way to twenty-year and thirty-year serial bonds amortized as to principal and interest. Further research is needed in the financing of capital outlay on the equalization principle to offset present heavy debt load, tax limitation, and mounting current costs. In addition, research to bolster legislation facilitating pay-as-you-go programs is badly needed.

School District Reorganization

Research in the field of school district reorganization has increased both in amount and in quality. Chief impetus was the impelling necessity to secure efficiency of administration to equalize financial load and to provide better educational services at no greater cost. The rural school district was given much careful study. A distinct feature of the research of the period was the increased emphasis on the enlarged intermediate unit.

In no fewer than fifteen states surveys of statewide scope were undertaken to establish facts upon which to erect a different school district organization, the chief objectives being the elimination of small, inefficient, costly rural districts and the creating of more effective units.

Concern was expressed over the danger of perpetuating undesirable patterns of organization thru stop gap, financial plans. To offset such possibilities, incentives to better reorganization were proposed in several researches. There still remain, however, some major handicaps to reorganization, most of them financial—(a) disposition of outstanding debt, (b) higher costs for new services, (c) transportation, (d) insufficient state aid. Reorganization has yet a major problem of joining the hands of local, state, and federal agencies into a unified, coordinated program of research and action.

Public-School Transportation

Public-school transportation has become big business. Buses carry millions of children daily and cost millions of dollars annually. Costs are increasing because more children are transported and because of the increased cost of equipment and higher wages of drivers. An increasing number of states are including transportation as part of the basic state aid program. The trend is toward school ownership of buses. However, the evidence is not conclusive that school-owned buses do provide cheaper transportation. Insurance on buses is relatively high for the amount of claims paid. Further research is called for in this new field. Some research indicated that savings may be made in the purchase of buses thru a state-wide purchasing agency. Again more research is needed to establish this fact. Student drivers are used in certain states to reduce costs. Are they as good drivers as older persons? Do they meet all requirements of the

liability laws in case of accident? Do they maintain good discipline of pupils on the bus? Someone should get the facts.

Personnel Activities and Related Problems

Research in the area of principles of business administration applied to personnel and other activities presented evidence of increasing interest in the non-teaching personnel, the heretofore forgotten school employee. Too little reliable factual data have been accumulated about the qualifications, personal and technical, for non-teaching jobs. What technical preparation is necessary, what inservice training is desirable, and what compensation and tenure are reasonable? Some researches sought to establish the line of responsibility of certain personnel, whether to the superintendent of schools or to the board of education. One study developed a formula for determining the number of custodians needed under given conditions. Research in the field of tenure and retirement provisions for non-teaching personnel moved at a snail's pace.

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INTRODUCTION

IN PLANNING the present cycle of the REVIEW, the editorial board decided to break the areas covered in the October 1944 issue into two issues: Education for Work and Family Living, and Education for Citizenship.

This issue of the REVIEW includes the chapters which carry forward the review of research in three areas: "Home and Family Life Education," "Industrial Education," and "Agricultural Education." The title "Business Education" has been used for a fourth chapter instead of that in the previous issue, "Commercial Education," since a section on "Distributive Education" has been included, and since the term *business* is coming to be used more commonly in the field. A separate chapter has not been devoted to work experience. The research on this problem will be found in the introductory chapter which is more general in nature.

HESTER CHADDERDON, *Chairman,*
Committee on Education for Work and Family Living.

CHAPTER I

Education for Work Movement

JAMES E. WERT AND CHARLES O. NEIDT

THE CONCEPT of inherent values in education for work is not new. During the last century the principle has evolved slowly and has been modified as a result of wars and periods of depression. During the last few years, however, a distinguishable pattern has begun to emerge. This pattern has resulted partly from changes in the social order and partly from thought given to the place of work experience in education. Studies concerning this relationship of work experience to general education were reviewed by McClusky (23) in the October 1944 issue of this journal.

History of the Movement

The major movements dealing with education for work prior to 1930 have been summarized by Sears (39). He traced vocational education from the apprenticeship training in the pre-Christian era thru the industrial revolution to our modern programs in the public secondary schools. He also examined the influences of social agencies and business organizations on the development of vocational education. Almost a hundred years ago the land-grant colleges and their secondary-school forerunners began their existence committed to programs for "education for work." Recognition of the need for education for the "laboring classes" appeared about 1845, but Mays (25) found that then the concern was for a cultural "up-lifting" rather than a desire to improve vocational competency.

The manual-labor movement, in contrast, was an effort to provide work experiences for students in classical colleges for the moral value and also for the financial support of both students and colleges. Mumford (29) described the difficulties which beset land-grant colleges resulting from the facts that: (a) the principle of government aid to higher education was new, and (b) there was skepticism about the desirability of teaching agriculture and mechanical arts in a college or university. Because farming was a family enterprise, these institutions soon saw the need for an educational program which was concerned with the welfare of the family. As a result, the foundations were laid for college home-economics departments.

Work experience at the college level may have had its beginnings in the land-grant colleges and universities. There was general agreement when these institutions were established that theoretical training alone would not accomplish the purposes, and that "manual labor" would be necessary. Some saw its value in dignifying labor, others in learning skills. The idea of self-support also influenced the amount of work experience in the early days. By 1900, work experiences had largely disappeared as an important aspect of programs in secondary and higher education except where such programs were tolerated for self-support.

The Present Status of Work Experience

Exceptions can be found where work experience has continued to the present as an integral part of the school program. Certain religious sects in privately owned secondary schools and colleges have continuously stressed the importance of work experience. Tucker (41) made an evaluation of work experience in twelve such private secondary schools in the Middlewest.

Among the institutions of higher education stressing work experiences may be mentioned Antioch College (40) and College of Engineering of the University of Cincinnati (36). The general applicability of the co-operative plan of education has produced a wide divergence of opinion. In general, however, these opinions have not been based on adequate research concerning the effectiveness of exploratory practices in other institutions. In many other colleges, such as Berea, Tuskegee, Park, and Blackburn (38), the program of work experience has been more closely bound up in the objective of student self-support than in the cooperative plans.

The impetus given work experience by the depression of the 1930's thru the NYA program is well known. Studies reported by Eurich and Wert (11) in Minnesota, and by Cowley (6) at Ohio State University, and others reported by Newman (32) indicated that such experiences may be justified in terms of education for work as well as in terms of self-support. Joyal and Carr (18) described work-experience programs in American high schools, outlined the history of school-work programs, set forth the role of the NYA in the movement, and pointed to the influences of World War II.

Eleven cities having large numbers of students carrying on a part-time school-and-work program were the subjects of an investigation during the war (8). The older students tended to improve in scholarship, but students under sixteen years of age regressed. Work programs aided in keeping pupils from dropping out of school, however.

Scarcely had the impetus of the work incentive of the depression subsided when the impact of World War II brought about a revival. This time the major objective was increased production in war industry and agriculture. No reference is made here to the many programs inaugurated except where there was considerable emphasis devoted to the idea of education for work.

The war has stressed values in work experiences which are to some extent equally adapted to a postwar society (14, 16, 17, 24, 44, 45, 48). Certain wartime innovations have been accompanied by attempts at evaluation in terms of usefulness of the experience to the individual. Most studies, whether wartime innovations or not, have utilized opinions of students and faculty in determining effectiveness of the experiences. Among these are studies reported by Weber (47) and Turrell (42). It was the consensus in these investigations that work experiences have been valuable to the individuals.

Area Schools, Junior Colleges, and Technical Institutes

Provision for education for work is meeting with a serious handicap in rural areas. The small school is unable to provide the variety of educational programs needed to meet the needs of young people. The area school has been proposed to make opportunities available in those fields of work in which pupil demand is too small to justify a program in small local schools. Educators in New York State, having recognized for many years the need for a larger school unit to provide more adequately for the educational needs of rural communities, proposed the formation of an intermediate-school district (4, 28, 32). One of the advantages of such a unit would be to facilitate the development of area schools to supplement the local high schools by providing opportunities for industrial education, distributive education, advanced business education, and homemaking projects. Two national committees studying problems in vocational education also pointed to the need for an expansion of the program into the post-high-school, junior-college, and semi-professional levels (1, 44).

Eells (9) found that there has been a growing demand for free public education in the two years beyond the twelfth grade, and that between 1920 and 1932 the percent of students electing terminal curriculums in junior colleges increased from twenty to forty-six. The number of junior colleges offering terminal curriculums also increased greatly in the 1920's and 1930's. The greatest interest in terminal courses has developed in California. However, some other states are concerned about this type of educational opportunity (15).

The development of a state program of institutes in New York had its beginning in six state schools of agriculture established between 1906 and 1916 (28). Later, technical education was added to their programs. In 1944, a plan was proposed to expand the program of the six institutes and to establish twenty institutes of applied arts and sciences for the purpose of promoting technical and general education thru a coordinated emphasis (34). A committee appointed to study needs surveyed technical occupations in forty-four industries. The number of youth required to provide replacements in these industries in the twelve geographical areas of the state was determined. These data were used in making proposals for programs to be undertaken and for estimates of cost (28).

General Surveys

Many community surveys have been made looking forward to more effective programs of education for work. Usually, these surveys have been made by, or for, a department such as agriculture, industrial arts, commerce, or home economics. Surveys of this type are apt to evaluate the data with respect to the contribution which a given department can make. Important tho this approach may be, the procedure may cause the omission of some areas of work by failure of the schedule forms to uncover needs not readily falling into such compartments as the departmental organization of schools now provides for vocational education.

The *Regent's Inquiry* in New York State is an example of a state survey which gave attention to the large problem of education for work. Norton (35) examined population movements, requirements of industry, occupational and geographic shifts within the state, and the mobility of labor. He analyzed the courses in the secondary schools which contributed to vocational adjustment. A companion study was made on the vocational plans of secondary-school pupils and the employment and unemployment of pupils who had been graduated or had withdrawn from high school.

Recognizing that changes in the school population forced a consideration of the problem of educating large numbers of youth who were not interested in continuing their schooling, The National Association of Secondary-School Principals made a study of occupational adjustment (2, 21). The investigation resulted in the collection of extensive data and the development of four instruments: Post-School Inventory, Youth-Interview Schedule, Employer-Interview Schedule, and Follow-up Card. Van Hoesen (46) also devised a schedule form.

Effects of Employment of Women on Family Life

The number of women gainfully employed has been increasing rapidly in the past fifty years (13). The increase was accelerated during the war (37), particularly among middle-aged married women. The effects of employment of married women on family life have concerned educators (44), but not much research has been carried on to determine the nature of the effects. Essig and Morgan (10) found significant differences between the responses given to most items in Scott's family-adjustment scale by two groups of high-school girls. Mothers of one group were gainfully employed, and the other mothers were not employed. Daughters of employed mothers gave evidence of a greater feeling of lack of love, understanding, interest, and cooperation; and, of disapproval and shame of their parents. Also, they were more inclined to disregard parental advice.

Mead (26) examined the attitudes toward women's work in relation to sex roles and pointed out the need for employers to consider seriously the types of jobs which combine well with motherhood.

Present Conditions Affecting Education for Work

Since education for work, if it is to be effective, must always be geared to the contemporary scene, it is essential to consider the rapidly changing occupational patterns in the postwar period. Many research studies and reports have been published having implication for presentday educational programs (7, 12, 19, 20, 22, 26, 27, 31 43). As can be seen from the titles the shift in occupational patterns has implications for education not only in work outside the home but also in home and family living.

On-the-Job Training for Veterans

Many publications have appeared concerning the educational and social adjustment of veterans. Details of plans for educational and on-the-job

training have been reported by Brown (3) in a study for the American Council on Education; by Cartwright (5) for the Institute of Adult Education; by the Educational Policies Commission (30); and by the Committee on Education of the U. S. Department of Commerce (43). Little actual research concerning on-the-job training has been reported to date. However, it is likely that some studies concerning the effectiveness of the program now in operation are in progress.

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CHAPTER II

Home and Family Life Education

RUTH T. LEHMAN

THERE are at least three areas of research that are of particular importance to the professional worker in the field of home and family life education. The first is concerned with *the home and family* itself, contributing to the growing fund of information about it as a social institution and, consequently, to its better understanding. Such research is particularly significant since it is the base on which all programs and courses in home and family life education must be built if education is to achieve its function of furthering an improved and satisfying family life in a democracy. Another important area encompasses the *subjectmatter* divisions of nutrition, child development, textiles and clothing, housing, and home management. Research in these fields means much for the enrichment of courses and curriculums. A third area is concerned with *teaching* in the field of home and family life education, and includes studies in history, educational theory and processes, personnel, and administration.

During the past three years, research studies reported on the home and family, and on the various aspects of subjectmatter related to the home, have been so numerous that they would require entire chapters for their review alone. For this reason, as well as the fact that they do not come within the scope of the present chapter, they cannot be included here. Attention is called to them merely as a reminder of their importance, and of the fact that studies in education should not be viewed "out of context" of closely related research.

Some interesting facts are evident from a review of research related to teaching in the field of home and family life education. Examination of *Notes on Graduate Studies in Home Economics Education* (34), issued by the U. S. Office of Education, shows that close to two-thirds of the master's theses reported for 1944 were at the secondary-school level and dealt principally with curriculum and administrative problems. The remainder was scattered among history and status, teacher education, evaluation, and methods. Doctoral and professional studies in 1944 and 1945, on the other hand, were distributed about equally between the secondary and college levels. They were largely in the areas of curriculum and evaluation.

Studies selected for review from the research of 1944-46, inclusive, reflect the latter emphasis and are drawn quite generally from the doctoral and professional group of studies, since those reported at the master's level are seldom available in published form.

Status of the Curriculum

A pertinent curriculum study at the elementary- and secondary-school level was by Williams (37) on the housing or home-improvement programs in five centers: Berea, Cincinnati, Cleveland, Indianapolis, and the Uni-

versity of Florida Project in Applied Economics at Gainesville. The investigator visited each community, conferring with administrators, curriculum directors, supervisors, and teachers. He also consulted local authorities in housing, health, and juvenile aid, and made a thoro examination of all available course of study materials used in the five situations. He found programs developed in two ways: with the subjectmatter approach in Cincinnati, Cleveland, and Indianapolis; and with the problem-solving approach in Berea and Florida. Where subjectmatter was emphasized, social studies took the lead. Home economics and industrial arts gave "little evidence of any particular concern for, or contribution to, the problem of housing improvement." On the other hand, when the problem-solving approach was used, no one subject seemed to dominate, and such courses as home economics and industrial arts made a major contribution. Certain points of difference were interesting. Cincinnati gave much emphasis to public housing and made extensive use of visual aids. The University of Florida and Berea projects were the only ones which focused their teaching on the problems of low-income families.

The status of college courses on the family and marriage was explored by Thurman (33) and Landis (19) thru analysis of catalogs and questionnaires. The former, confining her study to member institutions of the Association of American Universities, reported that such a course was offered most frequently by the very large, publicly supported, coeducational schools. However, only about 6 percent of the total enrolment was being reached. The work was offered for the most part by the sociology department; in fact, twelve times as often as by the home-economics department. Landis, on the other hand, found that about one-half of the sociology departments and one-third of the home-economics departments in teachers colleges offered such a course. The sociology course usually emphasized the family as a social institution, while home economics put the emphasis on family relationships.

Home economics has developed so rapidly in the colleges during the past fifty years that few realize its present extent. Hasslock (13) recently analyzed catalogs of 598 colleges which grant degrees to white women, to discover the recognition given to the field of home economics and to determine curriculum content for major students. She found 93 percent of these schools allowing college-entrance credit in home economics, and 61 percent with courses available in this field. Degrees in home economics were offered in 83 percent of the state and municipal colleges, 78 percent of the agricultural and technical schools, 54 percent of the teachers colleges, and 40 percent of the private institutions. There was no uniformity in either the type or amount of home economics required for a degree. However, foods and nutrition, clothing and textiles, and home management led, both in the frequency with which they were offered and in the amount of work available. There was some overlapping of high-school and college work in home economics. In general, the curriculum was over-

crowded leaving little opportunity for electives. In addition to providing for major students in the field, some institutions were experimenting with survey or integrated courses for the general education of all students.

Spafford (32) brought together findings from earlier scattered studies on the junior college and, for a selected group of schools, a statement of practices with respect to home-economics offerings for personal and home-life, homemaking, and preemployment education. Emphasis was given to the philosophy of home economics and education thruout the monograph.

Wartime changes in teacher-education curriculums in home economics were studied by Coble (6) in terms of their implications for inservice education of teachers in the postwar years. Evidences of change were secured from three sources: a general questionnaire study and an inquiry into various types of emergency short courses, both of which had been conducted by home-economics committees of the Association of Land-Grant Colleges and Universities; and also, from a study which had been made by Alice Keliher for the Wartime Commission in Washington. Changes were evaluated in terms of six criteria for a good inservice education program. Some of the recommendations were: that the use of such training periods as those afforded by the workshop and conference type of organization be continued; that an increased peacetime emphasis be placed on the co-ordination of all resources for teacher education; and that a purposeful attack be made on problems of the teacher's personal and social adjustment and on her development of a sense of social responsibility.

Van Til (35) in considering the present curriculum of the total secondary school presented a thesis that is of significance to those who work in the field of home and family life education. He advocated a functional curriculum in terms of social living, rather than the usual subjectmatter approach and proposed that this curriculum be drawn from the *interaction* of "a democratic pattern to give direction, the social realities, and the needs of adolescents." The centers of experience which he would set up in the curriculum include a number to which home economics could make a major contribution. Among these are: "home, school, and friends"; "choosing, buying, and using goods and services"; "keeping healthy"; and "personal development."

Teaching Methods and Materials

Observation of high-school classes as a means of learning about teaching was studied by Barton (1) who analyzed the reports of college students for evidences of their growth in social sensitivity, in use of reflective thinking, and in self-direction. Factors which were shown to be positively related to the growth of the college students in these directions were: observation in both the early and latter parts of a semester, extension of observation over a period of time, observation of a series of consecutive lessons, and observation of classes at more than one age level and under more than one teacher.

Three studies were concerned with the development and use of resource

materials in teaching. The first by Fleck (11) involved the preparation of a resource unit on "The Relation of Schools to Society," to be used in a course in education for freshmen preparing to teach. Among the important social pressures considered was the family. Included in the suggested materials were selected student problems and experiences, teacher experiences, motion pictures and recordings, methods of teaching and evaluation, and bibliography. Results of using the resource unit were evaluated thru interviews with instructors and the Freshman Program Executive Committee, and by analysis of student papers, recorded transcriptions of class discussions, and student questionnaires. Young (40) selected and studied resource materials for use "with prospective teachers of home economics in an attempt to improve the program in teacher education by improving the quality of human relationships in the class room." These materials—nine motion pictures, three recordings, and four short stories—were selected for their potential value in emphasizing with prospective teachers the constellation of human relationships observed, the probable needs of the individuals concerned, the ways in which good human relationships were furthered, and social values in the situation. Materials were selected on the basis of eight categories of needs, seven operations by which a teacher may further good human relationships, and ideas important for democratic living. Detailed analyses of the resource materials were made for use with prospective teachers, and suggestions were given for the evaluation of growth toward the objectives of the unit.

The basic concept of Young's research was carried a step further in the third study by Fults (12) in an inservice program with teachers. She sought to improve the learning of high-school pupils thru helping teachers to establish good human relationships in the classroom. For this study, she used three experimental classes and three control groups, all in home economics. Six tests and check-sheets were administered to pupils at the beginning and close of the experiment. These were concerned with social acceptance, pupils' problems and needs, intelligence, and reading comprehension. Each week teachers met with the research worker to study various resource materials which had been selected for their value in promoting deeper insight into behavior and personality development. These materials were supplemented by suggested guides on some of the learning difficulties of children. Findings were appraised in terms of the results of student testing, the teacher's anecdotal records and informal observations of the pupils' improvements. The experimental group showed important gains, some of which were statistically significant.

A most readable account of a study of college-teaching methods was given by Holway (17). She experimented with five types of laboratory experiences in child development: nursery school, child-development clinic, public schools, community, and cooperating homes. Full illustrations were given of the use of these experiences in preparental education to provide understanding of some ways to meet such basic needs of children as need

for a feeling of belongingness, need for acceptance as an individual, and need for expression of emotions. The effectiveness of the program was shown in certain evidences of students' increased understanding of children; improved technics in working with them; and in changes in the children, the mothers as they participated in the program, and the college students themselves.

Effectiveness of Courses and Programs

Interest in evaluation was particularly evident during the three-year period covered by this review. Outlaw (23) demonstrated the effectiveness of a nutrition unit in first grade when taught thru the various activities of the school day. Results showed a shift in total dietary practices toward the good and excellent end of the scale, and 30 percent more children eating good lunches by the end of the teaching program. Clark (5) studied the effectiveness of Red Cross nutrition classes in terms of evidences of nutrition learning, improved buying practices, and reactions of the group to the teaching program. The experimental group was made up of nineteen classes; the control group, of housewives who were not enrolled and who represented the same nationality and occupational groups. The experimental group showed some improvement in family dietaries, but it was demonstrated that changes in food habits are not brought about merely by developing an understanding of nutritive values. More emphasis was evidently needed on practice in family menu planning, on adequate breakfasts, on the economic and nutritive value of margarine, on the buying of fresh vegetables and fruits. Class size, the teacher, and certain types of class experience were found to be important factors in the success of the class as judged by women in the groups.

Seay and Meece, in a progress report of the Sloan Experiment in Kentucky (30), outlined the plan to be used in measuring improvement in dietary practices, resulting from the educational program now being conducted thruout the entire school in the communities which are included in the study. The plan calls for certain measurements to be taken at the beginning and close of the experiment, and at intervals thruout the study. These measures include such checks on dietary practices in the community as: one-day reports of family diets and records of food production and food storage, pupils' school lunches, and pupils' dietaries for a five-day period.

Two writers reported studies in the area of consumer education. Prevey (26) studied one hundred families who were from the upper socio-economic level and who had children who were juniors or seniors in high school. She held controlled interviews with the mothers to discover what experiences in the use of money were given their children. She also had the students check the Bell Adjustment Inventory, and the Stott Self-Reliance Scale. Four years later the mothers of fifty of these boys and girls filled out a questionnaire concerning the money habits of their children. Apparently no attempt was made to contact the young people themselves. The factors of childhood training which seemed to be most important in building a

sound foundation for competency in money matters were: an adequate and regular allowance, absence of parental domination, and gradual assumption of financial responsibility. Acquaintance with family financial matters and experience in earning were also valuable. There tended to be some relationship between personality adjustment in youth and ability in financial management. Kory (18) appraised the results of controlled group work on family practices in food buying. The college students in the experimental group were in food-selection classes. They checked their purchases each week against their family needs. At the end of four weeks their practical knowledge was significantly higher than that of the controlled group. They also used a smaller proportion of the family income for food. The study demonstrated that, for evaluation purposes, the gross-weight standard set by the Bureau of Human Nutrition and Home Economics was superior to the divisions of the food budget suggested by either Sherman or Gillett.

Several investigations dealt with the evaluation of an entire school program in home economics. Such research is a big and pioneer undertaking. Therefore, reports coming from it should be examined carefully for representativeness of the objectives being tested, for breadth and soundness of the evaluation procedures used, and for defensibility of the conclusions drawn. Brown (3) reported a study still in progress in twenty Minnesota high schools. Parker (24) summarized an investigation carried on in three schools in Kentucky. Both studies made much use of tests and various types of record sheets in measuring results of teaching. Creighton (8) gave a one-page sketch of a statewide evaluation of programs of work which is suggestive of a different type of approach to the problem. In this project, high-school principals, home-economics teachers, and state supervisors each year evaluated a variety of evidences of the work of the department in relation to five characteristics of an effective program. Their findings formed the basis for planning needed changes in the programs.

Holtzclaw (16) used a still different approach in her investigation of how well the home-economics program in North Carolina was meeting the needs of the Negro group. Using as criteria the standards proposed in *The Children's Charter* of the White House Conference on Child Health and Protection, she measured needs of the group against the home-economics curriculum in fifty-five federally aided schools. Statistical evidence of needs in employment, housing, and the like was secured from United States census data, the *Consumer Purchases Study*, and a variety of state reports. A study of the curriculum was made by examining the state course of study, textbooks, and various records and reports on file in the state department of education. Unfortunately, visits to the schools and conferences with teachers were not feasible. Among the conclusions drawn was the need for new units or increased emphasis on such practical problems as: the best use of a small income, simple house repairs and renovation, infant and maternal care, sanitation and privacy in the home, and problems of divorce and delinquency.

Student Abilities, Attitudes, and Values

Several pieces of research have dealt with other aspects of student evaluation than the results of specific teaching. Silverman (31) sought insight into the psychology of clothing and grooming behavior of adolescent girls. The major part of the study was based on questionnaire findings. The more challenging section, and one which invites further investigation, was the special study of the highest and lowest ranking juniors and seniors as rated on appearance by teachers. Her questionnaire findings were supplemented by the Sheviakov and Friedberg Interests and Activities Scales, and such personal information as intelligence, economic status, and leadership activities. Six case studies of those nearest the extremes in appearance ratings gave evidence that regard to care of appearance was purposive and rooted in the girl's history, a means of expressing psychological mechanisms and of working out conflict.

Long (22) reported a test of the ability of over two thousand junior and senior high-school boys and girls to recognize some of the more common problems of adolescents. The evaluation instrument used in this study is of special interest. It presented fifteen problem situations based on emotionally toned problems of young people which had been reported earlier by home-economics teachers. The students were asked to select from a list of seven suggestions the best and poorest ways of approaching each of five of the problems. A study by Lehman (20) tested the usefulness of attitude scales of the Thurstone type in checking attitudes of high-school boys and girls toward several social problems related to the home and toward certain close parent-adolescent relationships. Among other findings, the study demonstrated the importance of the implications of one's oppositions and uncertainties in any consideration of a "score," the cumulative effect of progressively stronger endorsements, the lower reliability of scales concerned with one's more immediate and personal behavior, and the superiority of descriptive response patterns over a numerical score.

A comprehensive attitude study at the college level was reported by Rockwood and Ford (27). Over three hundred juniors and seniors—about one-half of whom were men—filled out early in the semester an anonymous questionnaire on courtship, marriage, and parenthood. Approximately two-thirds of the group were enrolled in a marriage course. Some of the major findings indicated that in general, the attitudes of class and nonclass groups were similar; the most discriminating background factors were the student's home community and the college in which he was registered; the students had certain well-defined beliefs concerning such questions as qualities preferred in a mate, their standards of premarital behavior, and conditions under which divorce is justified; and outstanding differences in attitude were those between the sexes.

An investigation to identify some of the factors associated with social acceptance of students within college classes was made by Dirks (9). The Social Acceptance Scale, devised by Rath, was checked early in the

school year by students in thirty-six home-economics classes. Additional data were secured from students' confidential folders and thru interviews with faculty and selected students. Findings indicated the prevalence of "unknownness" among the students and gave evidence of the influence of large classes, formal teaching procedures, and rigid classroom arrangements in producing this condition. They gave evidence also of the relation between degree of acceptance and certain personal qualities. Implications were given for a student-guidance program.

Duvall (10) compared the concepts of parenthood held by mothers in various subcultures. Free written responses were given by women at a regular meeting of twenty-four mothers' study groups in answer to the questions: "What are five things a good mother does?; What are five things a good child does?" Statistically, significant differences in responses were found between social-class levels represented, Negro and white mothers, and mothers of older children, as compared with those whose oldest child was below school age. Mothers from lower-class levels, Negro mothers, and those with older children tended to give "traditional" responses to the questions.

Pattison (25) compared value patterns of a group of high-income farm families. The patterns were secured from two sources: (a) a values inventory, and (b) account records. Nine values were selected for study: education, religion, health, economic security, social relationships, workmanship, beauty, recreation, and status. An evaluation instrument was constructed of problems calling for choices of goods or services which represented approximately equal cash expenditures. Possible reasons for each choice made were then set up in terms of the special values being studied. Significant differences were found in value patterns among the families studied, and also in the extent to which value patterns from the inventory and the account records were correlated.

Aids for Occupational Guidance

Several studies were related to establishing bases for occupational guidance of students. Lehman (21) reported that the Kuder Preference Record revealed distinct differences in patterns of activity preference among various groups of practicing home economists. Secondary-school teachers as a group were highest in social service, artistic, and mechanical preferences; hospital dietitians in scientific and computational areas. Business home economists varied according to the type of business in which they were engaged.

Schmalhausen (28) investigated employment opportunities for girls in "down-state" Illinois. She then secured from a number of personnel directors in the state lists of characteristics which they considered important in their employees. These characteristics, in turn, were rated by a group of industrial psychologists and college teachers. Experiences useful in developing important characteristics were suggested for the three types of occupations in which the greater number of women in Illinois

were employed: domestic service, retail selling, and factory work in the clothing, textile, and leather trades.

The Successful Teacher

Williamson (39) in an informal study analyzed the ways in which successful supervising teachers worked with student teachers. From this analysis she set up characteristics of the good supervisor in terms of her handling of human relationships; her own technics of teaching, management, and supervision; her ways of helping the student teacher to assume responsibility, make plans, and evaluate teaching; and her methods of evaluating the ability of the student teacher. Hatcher (14) made a careful study of characteristic differences between selected, outstanding, and poor teachers of home economics in Michigan high schools. Sources of data were records on file in the college and state-education offices and controlled interviews with the teachers concerned, their superintendents, and a sampling of high-school pupils and mothers in each community. Thirteen discriminating characteristics of the good home-economics teacher were identified. Among these were the breadth and strength of her interests, her convictions concerning homemaking education, the quality of teacher-pupil and teacher-parent relationships which she obtained, and the teacher's contributions to the community.

Administrative Problems

Several investigations were concerned with problems of administration. Blazier (2) described the research on pupil needs, specifications, and other factors which were basic to planning and equipping a combination homemaking room in a California school. Standards thus established for equipment and arrangement were reported.

Using the questionnaire method, Walsh (36) surveyed current practices of remuneration for supervision in fifty-nine institutions which reported off-campus student teaching. There was no consistent policy. Sixteen schools reported no cash remuneration beyond the regular salary, tho in some cases the state department of education reimbursed higher salaries for these teachers than for others. Sixteen other schools paid the teacher a flat sum for supervision without reference to the number of students supervised; twenty-seven paid a stated amount for each student teacher. The source of funds was most commonly the state department of education; equal sharing of this responsibility by that office and the institution was next in rank. Reimbursement for travel to supervisory conferences was usual, but student teachers as a rule paid their own traveling expenses.

Chadderdon (4) reported a six-year study of teacher supply and demand in Iowa. Over one thousand students in Iowa colleges prepared to teach home economics during that period. Three-fourths of these gave some service to the schools of the state immediately after graduation, and one-third of

the balance taught elsewhere. By the end of three years, 59 percent of those teaching had left the field or the state. The demand for teachers increased in Iowa, but the proportion of 25 percent of new teachers remained approximately the same. There was no demand in the state for teachers with a master's degree. Analysis in one teacher-training institution of the reasons given by home-economics students for preparing to teach, as contrasted with those planning to go into commercial work, offered stimulating leads to other research.

Methods of working with a teaching staff on the college curriculum were studied by Scott (29) and tested in a practical situation with those of the faculty who were teaching a group of required home-economics courses at the freshman level. The over-all purpose of the cooperative approach was "to promote inservice growth and development of the faculty in order that educational experiences provided students might become increasingly effective in the promotion of satisfying personal, home, and community living." Four means of promoting cooperative work were used: all staff members who were teaching the required home-economics courses for freshmen formed a study group to consider common problems and goals thruout the year; a coordinator was selected from the group to give leadership and to promote the unification of the courses into a significant whole; instructors from different areas of specialization who were responsible for a given course were encouraged to work together on their teaching problems and plans; and finally, the staff was encouraged to help bring students into cooperative planning and evaluation. The results of the year's experiment were appraised informally in the light of eight criteria for sound curriculum development.

Henderson (15) analyzed the changes needed in the administration of home economics in college and university if these institutions are to contribute effectively to the improvement of home and family life thru communitywide programs, coordinated in terms of the democratic ideal. The implications of this thesis were developed. They were concerned with the exemplification of democratic values; the interdependence of residence, research, and fieldwork; the direction to be taken by these three types of service; efforts to be made for universitywide influence; facilitation of cooperative work on the part of all subjectmatter areas concerned with home and family life; encouragement of the growth of staff members; and facilitation of coordination of the various agencies for home and family life education.

Development of Home Economics

Not since the writings of Isabel Bevier has there appeared any extensive treatment of the development of home economics as an area of education. Two publications of the past three years have contributed to the historical literature of the field. Craig (7) gave a chronological account of significant stages in the development of home economics in the public schools and

colleges and in the various government services, and important events in the history of the American Home Economics Association. The study by Williamson (38) on the other hand sought to identify social and economic factors of the hundred-year period ending in 1918 which influenced the development of home economics, either thru leading to its introduction as a field of education or thru being a decisive influence in determining its character and direction. Among such factors were certain changes in educational philosophy and in the social and economic status of women. These received increased impetus following the Civil War when the greater emphasis on freedom and rights of the individual, the rise of science and industry, expansion in the West, and the establishment of land-grant colleges were developments of the times. The influence of certain strong personalities also gave impetus to the movement.

Needed Research

Encouraging progress has been made in research in home and family life education. Some vital problems are being attacked; sounder research technics are being employed in their study. Yet certain needs are evident if research in this field is to make its potential contribution. Studies are needed on adult and community programs, as well as at the secondary and college levels. They are needed in the areas of administration and supervision, as well as curriculum, methods of teaching, and evaluation. Clearly, not all workers can be productive in all areas and at all levels, but greater progress might be made if each institution concentrated on one or two, and if several workers developed problems cooperatively. It is heartening to note that one national cooperative is underway—factors affecting the supply of home-economics teachers. Finally, there is need for important research findings to be made more readily available thru publication, either as individual articles or as bulletins incorporating several related studies. Educational research which does not function is rather futile. It is lost if it ends merely in typed reports.

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CHAPTER III

Industrial Education

JOHN A. WHITESEL

A STUDY of the research of the past few years reveals some new developments, as well as the continuation of trends previously noted. One outstanding trend is recognition of technical change in our society. Another is the consideration given to reappraisal of educational programs and postwar educational planning.

Educational objectives are being subjected to careful consideration in the light of current needs. Curriculum adjustments, refinements, and expansions have taken place. A more functional approach is evident in the school program. There has been a decided trend toward improved administrative and supervisory procedures. During the past few years many problems pertaining to teachers have come to the foreground: the teacher shortage, the problem of adequate salaries, and the need for more teacher education. The consideration of social adjustment has been evident from the standpoint of rehabilitation and retraining of demilitarized persons, displaced workers, out-of-school youth, and youth in school.

Preparation for a More Technical Age

The gradual development of a new technology became increasingly evident during the depression years of the 1930's. It was greatly accelerated, and its highly productive nature was strongly emphasized during the war years (17). The consumer products of industry have become far more technical than was recognized in the past. The need for training the masses to live in a technical society has been recognized from the standpoint of both the consumer and the producer.

Hickok (22) found that technological study was not only desirable, but advisable, in the curriculums of general education on the high-school level. His study investigated the value of electronics in industrial arts education and offered methods and means for implementing it in the program. Wooden (62) concluded from his findings that with increasing technological developments, demand for an aeronautics offering in industrial arts education will increase in the secondary schools. In a study of inventions and their social-economic influences, Hamilton (18) found need for more emphasis on inventions in the industrial arts program.

Wake (57) conducted a study in which he found a need for comprehensive collegiate programs devoted to technical training in the graphic arts. He pointed out that executives of graphic arts industries are increasingly demanding higher training, and that there are only limited collegiate opportunities for such. Cotton (12) carried out a study on collegiate technical education for Negroes and proposed plans for the development of a

state program in Missouri. The industrial-educational needs of Negroes in Ohio were investigated by Chavous (10). He concluded that the greatest opportunities for Negroes in that state were in the industrial occupations, and that all Negro boys and girls should be encouraged to take industrial work from the elementary school into the college.

The significance of industry today in developing school programs was apparent in such studies as that by Huss (24) on a program of studies developed from the metal-manufacturing industries, and the industrial drawing course developed by Medlar (32) based on industrial needs. It is also apparent in Seaman's (49) study in which he consulted the opinions of labor and management in regard to a program of industrial education for Sandusky, Ohio. The conclusion drawn from the study was that a program for students planning to work in industry—if only one type could be offered—should be general industrial, and that schools should make some provision for specialization and cooperative training if there were sufficient enrolment and adequate placement opportunities.

Beckley and Smith (5) found that a great majority of the graduates of Rochester Institute of Technology were convinced of the value of the cooperative experiences they had received, and, if faced with the problem of returning to school, would choose such a program in preference to a full-time schedule. The success of work programs today was also stressed in the findings of Andrews (3) and Miller (33).

Educational Reappraisal and Curriculum Refinement

The war, and the reconversion period immediately following it, brought about such rapid and marked changes in social institutions that some revision of the educational program was inevitably required (37, 38). Proposals for the total educational picture, including inferences to objectives claimed for industrial arts and industrial-vocational education, have been made in *Proposals for Public Education in Postwar America* (36). It was recommended that, as a rule, vocational education thru grade fourteen should not be organized and administered in separate schools apart from general education. Where separate schools seemed advisable, these should also be responsible for the general education of its pupils. The authors of *Paths to Better Schools* (2) found the need for all youth to be broader educational opportunities including those for vocational training and work experience. They were agreed that vocational preparation in a family of occupations increases the individual's versatility and adaptability, and makes job adjustment easier; and, that terminal courses for technicians in various occupational fields should be provided by our public schools. Such courses should differ somewhat from either the programs for the training of craftsmen or professional engineers.

The report of the committee of the U. S. Office of Education to study postwar problems in vocational education (55) suggested groups to be served and recommended types of programs to be used. Problem-training

needs would include such groups as demobilized military personnel, displaced workers, and school-age youth. Recommended programs were all-day trade-preparatory, part-time, and evening-trade extension. Educational leaders believe vocational education will have to become more flexible; in the postwar era, it must meet the needs of more people, in more occupations, under a greater variety of conditions (36). London and Hostetler (29) in a study of postwar planning for industrial education, found a greater need for both industrial arts and industrial-vocational education in the postwar era of technical and industrial development. They also recommended more technical training (training for occupations above the skilled trades and below the engineering level) in the public schools and concluded that preemployment industrial-education programs should provide broad, basic training in the major industrial areas, rather than training for one specific job. Much the same was found by Lindahl (28) in an opinion poll which he conducted regarding postwar trends in industrial education.

During the three-year period, an effort toward curriculum improvement has been evident. Dixon (14) conducted a study on the organization and development of terminal occupational curriculums in selected junior colleges and Hosack (23) made a survey of industrial arts programs in thirty cities with a population range of 25,000 to 50,000 with recommendations for the postwar era. Josif (25) surveyed the industrial arts programs being conducted in the nation on the junior-college level and suggested more such offerings in the curriculum at this school level to meet the needs of the present industrial society. A study made of adult-education programs in Ohio showed that a competent teacher of industrial arts would be qualified to teach in such a program (30).

A growing tendency has been to make the content areas and the educational approach to these areas more functional in nature. It is not the content in itself that is of such great importance; it is the use of the content in solving the everyday problems of life. This attitude has been reflected in such studies as those by Hauenstein (19) and Scott (48) on a drawing program, by Tilley (54) on a synthesis of academic work and industrial education, by Williams (61) on housing education, by Casey (9) on design practice and application as related to industrial arts, and by the study on the teaching of consumer knowledges by Blawat (7). Studies with a similar point of view in other areas are the ones by Wells (59) on the value of industrial arts for secondary-school girls, and by Herold (21) on industrial arts in the elementary school. Herold concluded that in the elementary program the development of motor skills has a definite place, but is incidental rather than an end in itself; that industrial arts has fundamental values for all maturity levels. The value of a program of industrial arts on the elementary level was borne out in the study by Alterman (1). Cheney (11) found that summer-camp programs were providing a wholesome influence on the lives of boys in the present industrial society, but that they could achieve better results by the addition in

their industrial arts activities of more functional content under the direction of competent teachers. The effectiveness of different methods of teaching drawing was studied by Ray (43) and Stevenson (51). A functional approach by the use of applied problems was found just as efficacious and less time-consuming than abstract problems.

Administrative and Supervisory Improvement

Efforts to improve administrative and supervisory procedures have been apparent during the past few years. Improved supervision has been on a statewide basis as well as from a local or institutional point of view. Industrial arts teachers in Connecticut (53) developed a state program which was published in the form of a handbook for use in the supervision of industrial arts. A study of considerable value to state directors and state supervisors of vocational education as well as other administrators was conducted by Earhart (15) on vocational-teacher training and certification in trades and industries. It was found that great variations existed among the states, both with respect to certification procedures and to trade and educational requirements. Warner (58) made a comparative study of state-certification requirements for teachers, supervisors, and directors in vocational education in the United States from 1876 to the present time. The findings may throw some light on future trends.

Buboltz (8) analyzed the duties of the supervisors of industrial arts in Michigan cities having a population of over twenty thousand from the standpoint of factors of relative importance and value. A study of Deman-gone (13) in personal management was devoted to the training within industry of foremen and supervisors under the manpower commission. A manual for use in supervision of industrial-vocational education was developed by Lester (27). He prepared a job analysis of the supervisor in charge of an area in an industrial-vocational high school. Ross (44) conducted a study on the origin, development, and administration of certain phases of rural, community-vocational schools in Pennsylvania.

The matter of shop accidents and safety programs has been given greater stress. Two studies dealing with the subject were conducted by Beguhm (6) and Martin (31). Special provisions were recommended to meet the challenges to safety found in certain danger spots such as the earlier and later months of the semester, the use of machine tools in the elementary-schools shops, and in the concentrated dangers to fingers, hands, and eyes.

The administrative value of an annual, industrial arts, shop report to the principal, according to Henke (20), is in its use as an instrument of public relations by providing information to the public. Such a report can also furnish a basis to the administrator for determining the educational value of industrial arts education and its place in general education. A score card for evaluating industrial arts library material by Rust (45) and a checklist for graphic visual arts by Baltz (4) should prove of aid to administrators and teachers.

Some of the pressing administrative problems in industrial arts and

industrial-vocational education in the present period have had to do directly with the teacher; the shortage of teachers, minimum salaries, and salary schedules in keeping with the rising cost of living; and both preservice and inservice training. Ramsey (42) analyzed some of the underlying causes for shortages and developed a program of guidance in high schools designed to secure more college students in industrial arts education.

The democratic concept of educational administration is bringing about greater participation and responsibility on the part of industrial teachers in the planning and carrying out of the school program (39). This in turn necessitates a higher standard of preparation for teachers in industrial education.

Improved methods for the preparation of teachers have been given stress. Silvius (50) conducted a study on instructional units for professional courses in undergraduate industrial arts teacher education. Olivo (40) prepared a manual for inservice teachers with special reference to machine-shop work and indicated methods of developing instructional material in this field.

Better methods of evaluation have been coming into use in recent years. The typical objective test which replaced the traditional essay examination of the past is now giving way to more comprehensive evaluation. The mere testing of facts learned is being replaced by measurement of understandings. Students will give evidence of understanding if their reactions show that they know how, why, and when to use the information and skills gained from their industrial arts courses to meet situations in life (41). A test for shop teachers to show professional growth was studied by Wilber (60). Such a test can be used not only to determine the improvement during a period of time, but also can provide opportunity for comparing the product of a given school with that of the country at large. Other studies concerned with evaluation included an aptitude test for industrial arts by Schwalm (47), an analysis of testing methods and technics for use in the licensing of drivers with orthopedic disabilities by Elkow (16), an attempt at prediction of achievement in technical-service courses at Iowa State College by Swanson (52), and the study by Schahet (46) of the values of industrial arts as a selective agency for entering vocational trades. That there is urgent need for more research in methods of testing in industrial education was pointed out by Morgan (34). Since the cost of industrial education is relatively high, there should be greater effort given to the selection, classification, and prediction of pupils' abilities.

Social Adjustment

One of the recent aims of industrial education has been to aid in the educational and social adjustments necessary since the war. The industrial arts, vocational, and technical programs in upper-high-school and junior-college levels have proved of valuable assistance to persons of that age group. The jointly supported federal and state systems of vocational edu-

cation have offered educational facilities for large numbers of demilitarized men and women (35). Lester (26), in his report on providing for unemployed workers in the transition, proposed a program of education and training, both general and vocational, which would take the place of war-time programs. It would be designed chiefly for persons experiencing "re-conversion" and "frictional" unemployment. Courses would be arranged so that laid-off workers could begin course-study at once. A wide variety of general educational and basic vocational courses would be offered. Most of the vocational training should be along lines of business and in occupations that would expand after the war, but would in no way be a substitute for "on-the-job training." One study regarding physically disabled industrial workers was conducted by Wagner (56) in an effort to determine work efficiency in terms of production, attendance, accident rate, and severity of accident.

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CHAPTER IV

Business Education

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THERE has been a general trend thruout the country to use the term "Business Education" instead of the term "Commercial Education" when dealing with store or office occupational education or that phase of general education which deals with what everyone should know about business and its services. This marks the first time in the REVIEW that the term "Business Education" has been used.

Emphasis on research in the field of business education shifts from year to year as new developments occur. The reviews which follow are selected as being the most significant out of a large number in various fields. A section on distributive occupations has been added. An enormous amount of research in the field of distribution has been done by trade associations and by individual distributors. Some of these studies may have direct application to business education, but for the most part the data were not reported in a form to make it possible to evaluate the procedures and applications.

Secretarial Practices

Winter (24) made a study of the speeds of dictation in business offices for the purpose of determining what the levels of training should be for stenographic jobs. Eighty-seven different business firms cooperated in the study. The investigator observed 253 letters being dictated to the regular secretary involving a total of 498 minutes of dictation. By the use of a stopwatch she recorded the exact word that was being dictated at the end of each sixty-second period. Time out for telephone or other interruptions was not counted in the total time. Using carbon copies of the 253 letters, counts were made of words, syllables, and strokes for each one-minute interval. She found that the greater part of the dictation was given at a rate of sixty to eighty words a minute. Approximately 30 percent of the dictation was given at fifty words a minute or less.

There is a noticeable trend toward omitting the salutation and complimentary closing as superfluous in interoffice correspondence. Some firms even omit them on all correspondence.

Harms (7) made a study in cooperation with the Columbus, Ohio, chapter of the National Office Management Association to determine whether qualified office workers were superior to selected near-graduates in our schools, and, if so, how much. He set out to test the assumption that designated well-qualified office workers on the job rank higher than selected students in spelling, proofreading, and vocabulary ability, and in their speed and accuracy in typewriting. Only those students whom teachers were willing to recommend for office positions were included in the study. The

office employees were limited to those whose job titles indicated they were typists, stenographers or secretaries, and who were rated as well-qualified by their supervisors. Six hundred and two office employees from sixty-seven different firms, and 3081 students from widely selected cities participated. They were distributed as follows: 761 university students from thirty-four different institutions, 1720 high-school students from ninety-nine high schools, 508 students from parochial schools, and 92 students from six business colleges.

He found that the designated well-qualified office workers were not superior to selected near-graduates whom teachers were willing to recommend for office positions in spelling, word usage, and in accuracy of type-writing. The office group was significantly superior to the student group in typing speed. Henderson (8) made a study to find ways of improving the effectiveness of teaching Gregg shorthand by the functional method. After drawing up a checklist of problems of teaching shorthand by the functional method, she asked 150 shorthand teachers to indicate which were of major, minor, or incidental importance. An "exhaustive" list of technics or activities which might be utilized in alleviating the thirty-four problems were proposed and sent to a selected group of "highly successful" functional shorthand teachers for evaluation. The list was composed of five to fifteen devices or technics to be used in meeting each of these problems. She stated that only about 20 percent of the teachers reported that they followed the method completely and yet she apparently used them to determine what the problems of teaching by this method were.

Hylton (9) made an analysis of the results of the 1946 federal civil service stenographer and typist examinations. She reported that 225,000 persons took the tests and that between 40 and 50 percent passed. In some civil service regions as high as 60 percent failed. The conclusion was reached that the results are a serious indictment of the teaching of stenographic and typing skills in the high schools and in the private business schools, since the civil service tests measured those phases of skill-learning which are concentrated upon in most school programs, namely, business English, ability to type from straight copy, and the ability to take dictation and transcribe.

Shorthand

One of the common problems facing administrators and teachers is that of having some basis for knowing which of the many shorthand systems now on the market and being invented almost daily is the most satisfactory to use. Sherman (20) set about to isolate some of the factors which enter into the reading and writing of manually written shorthand systems and to establish criteria for the objective evaluation of shorthand systems with respect to their facility of reading and writing. His study was limited to structural characteristics and the judgment factors which enter into the reading of the system. He used a random sample of 614 words selected

from the 3000 words of highest frequency as listed in Horn's *The Basic Writing Vocabulary of 10,000 Words Most Commonly Used in Writing*. He felt that the 3000 words of highest frequency represented average dictation material.

Three formulas were developed for testing his assumptions. One of the formulas related to the *frequency of outlines* in any one system standing for more than one word or phrase. His *writing-efficiency* formula related to the number of strokes each system used to write a word and his *word-completeness* formula related to whether or not the reader had to supply from memory the parts of the word which the outline did not supply. He then applied these formulas to eight different shorthand systems. He found that shorthand systems can be differentiated with respect to these three factors.

Markwick (13) conducted a study to determine the relationships between medical-secretarial-training programs offered by junior colleges and the requirements of physicians; what the duties of a medical secretary included; and whether medical secretaries can be successfully trained in the junior college, and, if so, what the curriculum should be. The study covered a span of nine years and involved eleven junior colleges which offered medical-secretarial-training programs, 539 physicians from forty-five states, and 124 medical secretaries who were graduates of junior colleges. Her sampling of physicians and secretaries included all the essential elements of validity. The analysis of data collected was extensive and related to duties, technical activities, personal characteristics, and knowledges and skills needed to perform satisfactorily.

She found that a significant proportion of physicians cooperating in the study needed medical secretaries and believed that colleges with well-equipped and properly staffed laboratories could prepare them adequately. A large proportion of physicians reporting expressed their opinion that the teaching of laboratory technics in college laboratories is desirable and practicable; that the junior-college program should be developed in cooperation with medical associations; and that each student should have a three months' internship in a hospital approved by the medical association.

Typewriting

Du Frain (3) made a study of the practicability of emphasizing speed before accuracy in elementary typewriting to test the hypothesis that in learning motor skills the beginner should be taught speed first regardless of quality of output. She used a pair of experimental and control classes in each of four high schools. In each high school the classes were taught by the same teacher. The same materials, lesson plans, and testing programs were used in each class. The experimental and control groups each contained ninety-three students. The traditional view that in order to lower error rates, speed must be reduced, was not borne out in her study. Emphasizing speed before accuracy in elementary typewriting is practicable.

Bookkeeping and Accounting

A comparative study of college accounting students who have studied high-school bookkeeping with students who have not studied high-school bookkeeping was made by Sipe (21). There were twenty-eight students who had had bookkeeping in high school and fifty who had not. The two groups were placed in different sections and given the same instruction and the same examinations. The two sections were, however, taught by different teachers. The examinations were comprehensive and sufficiently objective to permit satisfactory comparisons. The study showed that in practically every phase of the mid-semester and final examinations, those who had studied bookkeeping in high school did better than those who had not. Twenty-one percent of those who had studied bookkeeping in high school made failing marks as compared with 38 percent of those who had not. Twenty-nine percent of those who had studied bookkeeping in high school made marks of "A", whereas, only 6 percent of those who had not, made "A" marks.

Ervin (5) made a questionnaire study of eighteen certified public accountants in Newark, New Jersey, to find out what they believe the businessman has a right to expect from the high-school graduate who has studied bookkeeping. The results were tabulated in terms of frequencies, showing what phases should be stressed in bookkeeping, what the student should be merely acquainted with, and what should be discontinued.

Distributive Occupations

Job analysis has long been considered essential to the solution of problems relating to efficient selection, training, wage scales, and promotional policies of business and industry. The analysis of the work of the retail salesperson and the clerical and nonselling jobs in retail stores has been neglected. Plant and Pope (17) conducted a study of the jobs in retail stores and compiled a list of requirements including primary characteristics, skill requirements, responsibilities, and job conditions as a basis for assigning weights to the various factors. They then formulated a job-measurement guide which gives the "point score" for each degree of each factor. The application of this guide makes it possible to arrive at a total-point score for each job. The field research was carried on in large department stores in six different large cities with the assistance and guidance of a large number of experts in personnel and management research.

The investigators indicate that "Job analysis is not a cure-all, nor is it infallible. It's a guide and not a 'god'." The report contains a brief checklist of the steps involved in organizing and undertaking a job-evaluation program.

Zubin and Peatman (25) made an analysis of claims of advertising research workers on testing the pulling power of advertising copy by using the split-copy technic. They developed a formula and presented three nomographs which the research worker can use to eliminate the necessity

of statistical computations in determining the reliability of results of split-copy advertising.

Eberhart (4) surveyed the demand in Indiana for teachers trained in retailing and selling occupations. He received replies from 151 high schools, 42 of which were not interested in offering such training, 62 which indicated they would offer training if the school had a teacher trained in the field, and 47 which were offering one or more courses.

The problem of educating persons who wish to establish small businesses has been attracting more attention because of the high incidence of failures among small businesses. The New York State Department of Commerce (15) has completed an analysis of publications that would be of value to persons concerned with this problem. The publications include trade magazines, books, and pamphlets. Many of the items are annotated. Over seventy-five different fields of small business are covered.

General Clerical Training

Business education has long been concerned with research in the fields of shorthand, typewriting, and bookkeeping. However, little research has been done in the field in which large numbers of young graduates of business departments actually work, namely, the general clerical field. Potter (18) made one of the original studies in this field. Her analysis of the work of general clerical employees was designed to determine the characteristics of the work of the typical employee and the characteristics of typical business inservice training programs so as to have bases for school programs preparing general clerical workers. Her study resulted in twenty significant findings, together with recommendations. The time-analysis charts, interview forms, and directions for filling in the time-analysis charts were included in the report. These should prove of value to others who wish to analyze the work of recent graduates.

Lennon and Baxter (12) investigated what specific aspects of clerical work are related to scores on the types of tests most commonly used in selecting clerical workers. A learning-ability test and a clerical-aptitude test were administered to two hundred and fifty employed persons including clerks, stenographers, and typists. The employees were then rated by their supervisor on a checklist which was considered an accurate measure of clerical success. The findings indicated that so far as the tests were concerned, there was some slight relationship between certain items on the checklist that could be predicted by test scores. For the most part, it was concluded that there should be separate tests for typewriting, shorthand, statistics, grammar, and spelling.

Textbook authors, teachers, test constructors, and others have long felt the need for some valid basis for the inclusion of economic and business terms in their materials. Lawrence's (11) study is a significant contribution to this problem. He made an analysis of the frequency of use of words and collocations of business and economic connotations in current, nontechnical

literature of high circulation. He analyzed the terms from approximately five hundred and fifty thousand running words in such sources as *Time* magazine, *The Saturday Evening Post*, and compared his derived list with the Lorge and Thorndike Magazine Count of five million words, indicating the frequencies which would occur if a larger sample had been used. Lists were derived containing 1483 words and 3150 collocations of business and economic use that should be known by readers who wish to read current popular materials dealing with business and economic life.

Tobin (23) made a survey of sixty business firms in Kingston, New York, to learn whether business students were receiving adequate instruction to fit them for initial jobs. Employers reported on the types of machines used for which they believed the school should give instruction, and on the various clerical duties performed by office workers for which the schools should train. He found the usual criticisms of employers with regard to fundamentals—lack of willingness to assume responsibilities, and general personal defects about which the schools should be concerned.

Epsilon Chapter of Delta Pi Epsilon (2) made a study of the pupils enrolled in commercial subjects in ninety-five public high schools of Massachusetts. Nineteen percent of the schools reported a trend toward requiring all pupils to take one or more business subjects. Approximately 45 percent of the school enrolment was in the commercial department and 9 percent of noncommercial pupils were taking one or more commercial subjects. The study also surveyed the guidance, placement, and follow-up programs of the school, and drew ten basic conclusions regarding commercial education in Massachusetts.

The office activities which commercial students are most likely to undertake on their jobs were investigated by Stockman (22). An extensive list of duties was drawn up. Replies were received from 427 graduates over a period of six years. The report includes tables showing the sixty-six most frequently performed activities grouped into eleven categories.

Pierce and Nichols (16) studied 3866 business firms owned and operated by Negroes in nine different cities as a basis for estimating the needs of business education in Negro colleges. They analyzed the volume of business done in these firms as it related to the business training of the owner. They also interviewed Negro consumers to determine their preferences as to patronizing establishments operated by Negroes as compared with those operated by whites. Almost 99 percent of the consumers stated they would prefer Negro to white if the prices, quality, service, and store appearance were equal.

A joint committee of the Seattle Chapter of the National Office Management Association, the Seattle public schools, and the University of Washington (14) conducted a study of business education in Seattle, Washington, for the purpose of bringing the schools and business closer together and to assist in planning for better training and placement of the graduates of the business departments of the high schools. They studied the problems

of beginners in office work and the mechanical equipment the beginners should be acquainted with, and be skilful in operating. The survey included vocational opportunities, needed curriculum changes, and equipment needs for high-school business education.

Teacher Education

Rowe (19) made a study of the comparative offerings in business-teacher education in liberal arts colleges with those of the four-year, state-supported, teachers colleges to see what types of course sequence and patterns were found in the two types of institutions, the grade placement of subjectmatter, and the amount of credit given. He limited his study to a sample of twenty-six liberal arts colleges and twenty-eight state teachers colleges. He found that liberal arts colleges were devoting considerably more time to general education than state teachers colleges, that little uniformity existed as to the amount of credit allocated to the various subjectmatter divisions, and that state teachers colleges required considerably more general professional education in the business-teacher education curriculum than did the liberal arts colleges.

The Bureau of Business Education, California State Department of Education (1) studied business education in California as of March 1945 to aid in determining the type of teacher education needed and to ascertain the status of business education in the state. Data from 116 junior high schools, 338 high schools, and 39 junior colleges were secured and compiled. The top three subjects in student enrolment were typewriting, book-keeping, and shorthand, in that order. A total of 1844 teachers in business subjects were employed in the junior colleges, high schools, and junior high schools, of which over 1400 taught one or more business subjects. Four state colleges and two of the major universities offered comprehensive programs for the training of business teachers. Thirty-six communities were served by the federally aided distributive occupations program during the year 1944-45. Only 124 students were enrolled in the cooperative part-time program.

To determine to what extent the interests of women teachers of business subjects in public-secondary schools differ from those of women in other occupations, and whether the interests of women teachers of specific business subjects vary from those of other business subjects, was the purpose of Koepke (10). He contended that if the interests were significantly different, the scales could be used in counseling prospective teachers. He used the Strong Vocational Interest Blank for Women as his measuring scale and drew eleven conclusions from the data collected. The major conclusion was that the common interests of business teachers and office workers suggest that women scoring high on the scale for office workers would make a satisfactory adjustment in the teaching of business subjects so far as interests are concerned.

Graduate work in the thirty-eight institutions of higher education in the

United States that offer programs in business education was surveyed by Garrett (6) to ascertain what particular courses are considered most desirable for a master's degree program for the secondary business-education teacher. He studied the following requirements: admission, subject-matter, professional education, and minimum standards of accomplishments in the skill subjects. He used a questionnaire and college catalogs as the sources of his data. Most of the graduate courses offered in business education were found in the fields of administration and supervision, curriculum, principles and organization, methods of teaching, and research. Ninety percent of the institutions admitted graduates and undergraduates to the same courses; only 50 percent of the institutions required a different quality or amount of work from the two groups. For the master's degree 70 percent of the institutions required students to carry on a research project and write a thesis. Twenty percent made a thesis optional. Seventy percent reported that a final comprehensive examination was given master's degree students, but none required an examination in skill subjects to qualify for the degree. Only 7 percent reported that they required actual business experience of graduate students.

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CHAPTER V

Agricultural Education

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Most, if not all, education in agriculture contributes directly to vocational proficiency. Farming, as the pivotal occupation in agriculture, is outstanding among all occupations to the extent to which it influences the character and values of the family life of those engaged in the occupation. Hence, in large measure, education in agriculture is significant both for work and for family life.

Education in agriculture is available not only to persons regularly enrolled in educational institutions, from the upper elementary grades to graduate schools, but also to youth and adults not enrolled for full-time school attendance. Programs of education in agriculture are conducted thru public schools and other agencies. All too often the scope of problems investigated has been limited to one level or to the program of one agency. Problems are not limited to single programs. The research in one area often may have value in several programs. Hence, it is encouraging to find several studies (53, 62) in which problems cut across the usual arbitrary dividing lines of responsibilities between agencies. In view of the interrelationships and opportunities for constructive cooperation that were illustrated in three investigations (20, 39, 63), it was thought to be appropriate to consider research in agricultural education *in toto*. Smith (50) in the previous issue of the REVIEW included only studies in vocational education in agriculture carried on by the public schools.

Previous reviews and summaries in agricultural education have included a total of 837 studies. In two publications (44, 45) the studies completed between 1917 and 1940 were summarized. A majority of the studies were in the specific area of education in vocational agriculture.

More than one hundred and twenty studies were considered in preparing material for this chapter. A continued high regard for research was revealed in these studies in spite of the wartime pressure for more direct accomplishments. The studies included in this chapter were selected for their relationship to the theme of the issue, and for their quality, representation of different areas, accessibility, and illustration of new approaches and technics. Counsel was sought in appraising the studies and in locating studies of merit to insure quality and scope of treatment.

Trends in Character and Scope

Smith (50) pointed to such needed developments in research in agricultural education as a more thoro evaluation of current experience, the initiation of cooperative research, an increased effort to organize studies to extend over longer periods of time, and the development of ways and

means to insure wider dissemination of research. Progress in these directions was evident.

The recognition of interrelationships and the extent of the investigations of broad problems were appreciably increased over the situation existing in earlier research. The American Vocational Association (3) suggested research problems which involved not only the program of education in agriculture, but other programs of education in vocations. The importance of articulating education in agriculture at all levels was emphasized by Stewart (55). Bradford (9) concluded that the provision of adequate programs of education in agriculture thru public secondary schools was closely associated with the organization of the school. Ekstrom (15) studied the problem of education of farm boys and girls not only as it related to agriculture, but in other allied respects. The investigation of the broader, and often common, problems in agricultural education and associated areas is desirable. In particular, the problem of educating for farm-family living requires a breadth of attack not usually characteristic of courses called agricultural education. Active cooperation on the part of individuals from several agencies was secured in a study by Frutchey and Lathrop (20) of the employment of nonfarm youth for work on farms.

If research is to gain in functional value, a coordination of efforts or active cooperation from initial planning to ultimate application and validation would appear to be vital. The participation of research representatives from several states in cooperative studies (11, 12) in vocational agricultural education were noteworthy. Twenty-three states cooperated in a study by Lathrop and Clough (34). Youth having experience in 4-H clubs, and those having experience in vocational-agriculture classes were reported as equally favorable toward farming (64). Future Farmer chapters and 4-H clubs cooperated in a survey (23) of farm and home accidents, revealing the seriousness of a problem common to all types of agricultural education.

To study current practices requires that education in agriculture make practical commitments to research. Centers must be established in which stated goals are to be sought, the factors judged significant investigated, a record made of procedures followed, and the outcomes measured. Other research most assuredly precedes the practical commitment, but thru the latter type of investigation, much can be done to make research more functional. The difficulty in determining or controlling the factors in situations involving human beings is extreme; but nevertheless, such factors characterize the situations in which teachers are expected to effect improvement.

A procedure illustrated in a study by Hamlin (24) of the functioning of local advisory committees in program planning and evaluation is worthy of consideration and further testing. Four states have established pilot or developmental centers for the purpose of testing thru practical commitments, the principles and procedures essential to the development of successful joint programs of education in farm-family living for young men

and women. LeBaron and Martin (35) report progress in one state which is indicative of accomplishments.

Program Planning in Agricultural Education

The special demands made on programs of education in agriculture (63) during the war period intensified research efforts in all phases of program planning. Programs born in the war emergency, and the forced adaptations of existing programs, opened new horizons and stimulated investigation of the problems involved in providing expanded or extended programs of education in agriculture. The trial-and-error method of establishing programs seems to be giving way to more intelligent planning based on research. It appears that a general agreement concerning purposes has been reached since major efforts were directed to a study of needs and methods by expanding or extending education of proven merit. Efforts of this character are worthwhile but at the same time a continual reexamination of purposes is essential (53, 63). The technology of agriculture and the pattern of farm life are dynamic factors to be considered in this connection, according to McKim (37).

Programs of agricultural education cannot be planned without regard for other educational needs or without consideration of other educational programs (33, 38, 40). A report of the Association of Land-Grant Colleges and Universities (8) emphasized the indivisibility of the problem of meeting the educational needs of rural people even tho specific education in agriculture and the work of the farm is needed. Postwar readjustments in agriculture (21, 52, 63) have a direct bearing on the program of vocational agriculture.

Planning programs of agricultural education on a statewide basis has the advantage of perspective which is of value in interpreting detail secured in planning for a smaller unit. Organization of secondary education in relation to education in vocational agriculture received wide recognition. In general, the conclusions reached by Lancelot and Morgan (33) and Martin (38) indicated that education in agriculture could be made available to many persons in rural areas not yet served only as a reorganization of general education occurred. Bradford (9) secured data from forty-three states and seventy-two departments of vocational agriculture located in small high schools in twenty-four states for comparison with similar data for Nebraska. He found that many states attempted to extend the teaching of vocational agriculture into the smaller rural high schools (enrolments under 100), in which approximately 22 percent of all departments of vocational agriculture were located. In the case of departments located in small schools in which the teacher gave his full services to the teaching of vocational agriculture, the annual per pupil cost of those services based on a \$2000 teacher salary was reported to exceed \$70. He concluded that with additional financial assistance from federal or state government, a 100 percent expansion in number of departments was possible in Nebraska.

However, the study presented limited data on the financing of education in agriculture, or education in general, as a basis for the conclusion reached.

The problem of providing agricultural education for high-school groups received major emphasis. An investigation of the program in New York (63) indicated that an opportunity existed for expansion and improvement of agricultural education at all levels, emphasized the need to develop a unified education at all levels, emphasized the need to develop a unified program of agricultural education in the state, and recommended the further development of the post-high-school agricultural and technical institutes as centers for the improvement of rural living.

Sound programs of education in agriculture, it is generally recognized, are developed on the basis of a knowledge of the resources and needs of the area to be served (18, 29, 46). The methods utilized, and the findings of such studies, often have general significance even tho the greater returns usually accrue to the improvement of the specific community or area program. Anderson (7) studied the vocational interests and occupational careers of 683 high-school students over a period of fourteen years as a guide in planning programs. Vocational interests were rechecked twice yearly over a four-year period, as well as at the time of entering high school in 1929. In 1943, he secured data on the occupational pursuits of 586 members of the group. At that time, less than 20 percent were in occupations indicated by their vocational interests when they were seniors. Conditions due to the war probably affected the careers of many in the group studied. A course of study in consumer agriculture (22) was developed for a specific community in which a majority of the families secured a portion of their livelihood from the land. There was other evidence (16, 17, 26) indicating the need for programs in agricultural education, adapted to the part-time farming group.

The importance of education in agriculture for nonschool groups has received recognition (5, 52). Furthermore, there is an increasing awareness of the timely and functional values of instruction in family-life problems for the group (13, 35). Fife (17) thru personal interviews, questionnaires, and historical research in the problem of planning programs for young farmers, concluded that the emphasis of such programs in Ohio should be on earning a comfortable living. He also concluded that programs for young farmers should be planned on a community basis and include both veterans and nonveterans. Problems of guidance and placement, as well as problems of a national or international character, were reported as of concern to veterans. Altho the sampling of veterans was carefully planned, it included only 130 cases, all high-school graduates. Hence, as indicated in the report, there was a need for additional studies of veterans who were nonhigh-school graduates.

A study limited to veterans from a rural area by Hoskins (26) presented data basic to the organization of educational programs in agriculture or other subject fields. He studied the educational records and work experience

of eight hundred young men from three rural areas in New York who entered military service prior to January 1944. Certain sections in the schedule were adapted from the U. S. Census, facilitating direct comparisons with census data. Resources of the areas and employment opportunities were enumerated. The study was designed to stimulate interest in, and establish patterns for, the development of programs for veterans. Its usefulness as a pattern would have been greater for teachers, extension agents, or other local leaders in agricultural education with limited time and resources if data to be collected had been more carefully chosen, and if simplified schedules had been developed. The need for developing simplified patterns for studying problems of education in agriculture must be recognized if research is to become a functional tool of those who deal most directly and realistically with the formulation of programs of education in agriculture. The procedure used by Hamlin (24) provided for participation of teachers of agriculture and other leaders who constituted an advisory council. As a coordinator, he worked with the council to establish objectives and evaluate criteria for a program of agricultural education. The project, planned to extend over a period of five years, has as its purpose the investigation of the functioning of an advisory committee. The method followed brings research in program planning to what might be termed the critical level.

Programs of agricultural education become effective thru individual teachers. Anderson (6) studied the educational and experiential backgrounds of 175 graduates in agricultural education. The findings of his study have considerable value in developing preservice programs of education for teachers of agriculture. Hayden (25) analyzed transcripts of credits of graduates (1941) in agricultural education. He reported little significant change in course titles or credit hours over those reported in an earlier study. The proficiency in technical agriculture of beginning teachers was studied by Rhoad (48). Many deficiencies were noted and his recommendations for adjusting programs of teacher education constitute a worthwhile contribution. Other investigations (2, 45, 58) also relate to the collegiate programs of preparation for professional positions in agriculture. Hoskins (27) discovered a limited relation between salaries and teaching situations. Sanders and Richards (49) found low salary to be one of the reasons for teachers of agriculture leaving the profession.

Evaluation and Appraisal

An analysis of past functioning of the same or similar programs can contribute much to the planning of programs or improving programs of instruction in agricultural education. Because of the interaction between evaluation and planning, it is impossible to make absolute distinctions in a classification of studies. The studies so classified, in general, had evaluation as a primary purpose and appeared to give evidence that the

author recognized the importance of a continuous effort to evaluate and appraise.

Twenty-three states participated in a national appraisal. Each of the states cooperated in an appraisal at the state level by Lathrop and Clough (34), of the Food Production War Training Program. Participation of specific states to insure geographic distribution, and the inclusion of equal numbers of strong and weak local programs, were significant features in the sampling technic. The study included 359 local programs. Interviews were had with 4568 enrollees. Of the several courses offered in the program, that of producing, conserving, and processing the family's food supply probably made the greatest direct contribution to family living. The average number of new or changed practices adopted by persons enrolled in this course was 5.6 and attendance averaged 23.5 hours per enrollee. Eighty percent of enrollees planned to continue to use the school community canning centers. The three major advantages of the course as reported by enrollees centered around time and labor-economy training, and superior equipment. Raper and Summers (47) found that the rural people believed that community canning centers and farm machinery repair centers should be continued as a part of the program in public schools. Personal interviews were made with 613 farmers in thirty-two widely scattered counties; two-thirds of those interviewed were owners, and the others, tenants and sharecroppers.

During the triennium, many nonfarm youth worked on farms in the summer months as Victory Farm Volunteers. Evaluation studies of this program were made cooperatively by workers in eight states. While primarily concerned with developing key points of a successful program for the war emergency, the evaluations reported by Frutchey and Lathrop (20) may well serve as a basis for planning future farm-work experience for urban youth. Numerous local committees participated in a national evaluation study (60) of programs in vocational agriculture. Strong and weak programs were contrasted in a manner to assist an individual teacher in evaluating his work.

The judgments of farmers were used by Starrak (54) to secure an evaluation of programs of agricultural instruction in school and college. Two hundred and forty-three respondents of a carefully selected group of successful farmers gave judgments used in obtaining the evaluation. In education, farm tenure, status, and size of farms, they were above the average of all farmers in the state. Their ideals and goals would be expected to exceed those generally sought. Over 50 percent included among their criticisms of public-school education that "pupils do not learn to work." Farmers were less critical of the program of vocational agriculture in the secondary school than of any other program of agricultural instruction, and most critical of general agriculture. In judgments given on specific objectives, over 75 percent of the respondents would give considerable

emphasis to the development of interest and appreciation for the importance of farm, home, and family life.

Criteria for the evaluation of programs of teacher education (28) and for the establishment of departments of vocational agriculture (57) merit consideration as aids to evaluating specific situations and to possibilities in method.

Deyoe (14), using two equivalent forms of a test of understanding and problem-solving ability, studied individual differences and growth of sixty-seven students of vocational agriculture. By including students from each of the several years in which agriculture was offered and extending the study over a school year, he was able to evaluate, to some extent, a growth pattern for a period of years. His findings indicated that both percent and numerical gains decreased with each succeeding year of instruction in vocational agriculture. Inasmuch as this is one of the first studies of its kind in the field, there would appear to be a need for repeating it with larger numbers of students. Attention might also be given to the development of other tests which would be appropriate for the measurement of growth in the field of agriculture. However, as a pioneer study, it has considerable significance as an evaluative technic and as a means of effecting improved instruction in agriculture. The need was pointed out (19) for tests measuring understanding of social and economic problems for use in evaluating vocational-agriculture programs.

Improvement of Instruction

The effective guidance of persons toward or away from the study of agriculture becomes increasingly significant as the proportion of the population needed in agriculture declines. Rural areas have a relatively high birth-rate, so many youth must leave the farm. Clough (13) concluded that parents, schools, and other agencies should give more attention to the problem of preparing sons for separation from parental homes. A comprehensive analysis of the problem of assisting boys and young men to become established in farming was presented by Zeran (66). There remains, however, a need for parallel material to serve as a basis for assisting women to evaluate the potentialities and limitations of farm-family living and farming as a career in partnership.

Guidance and placement represent only a part of the total responsibilities of teachers of vocational agriculture. In a study of use of time by teachers of vocational agriculture, Sweany (59) found 58.5 hours to be an average workweek. He reported that teachers needed additional time for home visits, and that adult classes constituted overtime work. Statistically significant differences were found in both the total hours worked and the hours devoted to agricultural work between teachers who conducted adult classes and those who did not. He drew from the findings many suggestions for teachers and administrators with respect to making more efficient use of the teacher's time. The element of time was also investigated in twenty-

four states (42) as it related to the scheduling and teaching of vocational-agriculture classes. Effective solutions to the problem, it was concluded, would be possible only with more flexible time schedules and requirements. Basic studies are needed to establish time requirements for specific learning activities.

Progressive establishment in farming is a central purpose of education in vocational agriculture (52) and, to some extent, it influences other specific types of agricultural education (10, 53). Establishment in farming includes establishment of the farm-family home and life pattern. Farming programs of the learners and on-the-farm instruction for youth and adults have contributed to establishment (15, 44, 54). Improvement of instruction in agriculture to some extent, therefore, is dependent upon the development of superior technics in initiating and supervising farming programs (32, 51, 61). The follow-up of former students (7, 15, 37), the studies of environmental and experimental backgrounds (13, 17), and the analysis of opportunities (30, 46, 65) are essential to many phases of the program, but are particularly significant in the development of student-farming activities leading to establishment in farming.

Instruction evaluated in terms of significant improvements made by the learner in his farming operations must be constantly readjusted in the light of occupational changes. The development of cooperatives as reported by Cline (11) and MacDonald (36) illustrates a practical approach to the teaching of improved practices, as well as a method of developing an understanding of the vital principles of cooperation. A more effective use of current periodicals is advocated by Knight (31) as a source of current scientific and technical advances in agriculture, and as an aid to keeping content in agriculture up to date.

A specific teacher guide to materials of instruction (44) represents a valuable means of aiding teachers to keep content abreast of occupational change. Strong (56) found that courses for adult farmers in Iowa which were based on current farm problems had larger enrolments and better attendance than did those courses which included only specific units. The number of improved practices followed per member varied somewhat with the type of course; the differences favored the two-unit course over the one-unit and the current farm-problem courses.

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INTRODUCTION

IN PLANNING the sixth cycle of the REVIEW, the Editorial Board elected to divide the October 1944 number into two separate issues entitled Education for Work and Family Living and Education for Citizenship. Education for Work and Family Living appeared in June, 1947. Materials on Education for Citizenship are appraised in the following pages of this issue.

The committee was instructed to cover the topics, general education, social studies, and trends in social education of the previous cycle and such branches of adult education as pertain to social studies, intercultural education, international understanding, and civic political education.

In spite of the importance of the subject, the present state of publication did not permit the inclusion of data on adult education for international understanding. Later committees will undoubtedly have more adequate material in this area to draw on. For trends in social education, the committee substituted a chapter on intergroup education, because intergroup education is a major trend in the field and much trend material is contained in the chapter on the social studies. Care was exercised, of course, to avoid duplication with a related chapter in the February 1946 number of the REVIEW.

This number is a new entity in the cycle of the REVIEW. The committee makes no pretension of having definitely blocked out the limits of the field, but hopes that it has begun the task of delineation so that the work of successors will be facilitated.

HOWARD Y. McCLUSKY, *Chairman*
Committee on Education for Citizenship

CHAPTER I

General Education

KARL W. BIGELOW

THE three-year period covered by this review was opened by the publication of a significant report (1) on general education prepared by a committee of the American Council on Education at the request of the armed forces. This document defined general education as embracing "those phases of nonspecialized and nonvocational education that should be the common possession, the common denominator, so to speak, of educated persons as individuals and as citizens in a free society." (1: 14-15) It also included a list of objectives of general education, stated as follows:

. . . In the committee's judgment, general education should lead the student:⁸

1. To improve and maintain his own health and take his share of responsibility for protecting the health of others
2. To communicate through his own language in writing and speaking at the level of expression adequate to the needs of educated people
3. To attain a sound emotional and social adjustment through the enjoyment of a wide range of social relationships and the experience of working cooperatively with others
4. To think through the problems and to gain the basic orientation that will better enable him to make a satisfactory family and marital adjustment
5. To do his part as an active and intelligent citizen in dealing with the interrelated social, economic, and political problems of American life and in solving the problems of postwar international reconstruction
6. To act in the light of an understanding of the natural phenomena in his environment in its implications for human society and human welfare, to use scientific methods in the solution of his problems, and to employ useful nonverbal methods of thought and communication
7. To find self-expression in literature and to share through literature man's experience and his motivating ideas and ideals
8. To find a means of self-expression in music and in the various visual arts and crafts, and to understand and appreciate art and music as reflections both of individual experience and of social patterns and movements
9. To practice clear and integrated thinking about the meaning and value of life
10. To choose a vocation that will make optimum use of his talents and enable him to make an appropriate contribution to the needs of society

From a survey of the general outcomes, it may seem that the committee omitted one of the most important aims of general education, the ability to think rigorously and critically. The committee took the position, however, that this ability should be developed and applied as an integral aspect of the learning process throughout the educational program. The knowledge, skills, abilities, and attitudes involved in critical and reflective thinking should be emphasized as the necessary tools for the analysis and solution of problems in all fields.

⁸The committee is aware that some of these objectives are closely related and could be subsumed under fewer categories. Certain aspects of general education have frequently been neglected, however, and therefore it seemed desirable to give these phases emphasis by specific statement.

The body of the report was given over to an analysis of the declared objectives and (in larger part) to detailed suggestions as to courses for a program of general education in the armed forces.

The American Council report was focused on general education at the college level. An equally significant report (31), published by the Educational Policies Commission at about the same time, was concerned with secondary education, but included the junior or community college under that heading. It argued that

every youth in these United States . . . should experience a broad and balanced education which will (1) equip him to enter an occupation suited to his abilities and offering reasonable opportunity for personal growth and social usefulness; (2) prepare him to assume the full responsibilities of American citizenship; (3) give him a fair chance to exercise his right to the pursuit of happiness; (4) stimulate intellectual curiosity, engender satisfaction in intellectual achievement, and cultivate the ability to think rationally; and (5) help him to develop an appreciation of the ethical values which should undergird all life in a democratic society. (32: 21)

The Policies Commission report recommended, for purposes of general education, a course in "Common Learnings," continuous thru grades ten to fourteen, inclusive, with two periods allotted to it daily for the first four years and one during the junior college years. This was to deal, in integrated fashion, with matters of politics, economics, the family, consumption, the arts, and language so as to develop thinking power, respect for others and cooperation, ethical insights, efficiency, and self-reliance (32: 249-50). Science was proposed as a separate course in general education in grade ten. Heavy emphasis on guidance and on the relating of general education to community needs was recommended. All these ideas received further emphasis in the eighth yearbook of the John Dewey Society (22).

The courses in general education recommended by the American Council committee were a blend of the conventional and the functional; those prepared by the Educational Policies Commission went much further in the direction of functionalism and integration. In interesting contrast with both was the pattern designed for Harvard by a committee which spent two years and a considerable sum of money studying general education for that university. Its report (15) recommended adaptation of the divisional plan, with at least one general course to be taken in the natural sciences, in the social sciences, and in the humanities, respectively, and three more to be selected at will from among these areas. The development of special courses for the purpose of general education was proposed, however, and significant emphasis was laid on the importance of finding teachers interested and able to instruct general students as contrasted with specialists. Moreover, the Harvard committee urged that general education be carried on thruout the four undergraduate years, not concentrated in the first two as has become customary in the majority of institutions.

But the Harvard Report's contribution was less in its proposals for Harvard College than in its explorations into the whole question of general education, at both the secondary school and college levels. The committee

saw general education "as education for an informed responsible life in our society," chiefly concerned, therefore, with "the question of common standards and common purposes." Such education should be contrasted with special education which has to do with the development of "competence in a particular lot" (15: 4). In setting forth its views the committee dealt with the significance for general education of such contrasting terms as Jeffersonianism and Jacksonianism, unity and diversity, heritage and change. By and large it inclined to the taking of moderate positions with respect to all these matters. The goals which it chose to emphasize were expressed as "traits and characteristics of mind fostered by education," specifically, the abilities "to think effectively, to communicate thought, to make relevant judgments, to discriminate among values" (15: 64-65). "General education," the committee declared, "must . . . be conceived less as a specific set of books to be read or courses to be given, than as a concern for certain goals of knowledge and outlook and an insistence that these goals be sought after by many means as insistently as are those of specialism" (15: 80).

Some Individual Views

Conant (9), following the publication of the Policies Commission and Harvard reports (with both of which he had a connection), undertook to demonstrate their compatibility. He was concerned with the implications for general education of the need for greater fluidity in our social and economic life and for the tapping of reservoirs of potential talent. He declared that "the nearer we approach thru education to our avowed goal of equality of opportunity . . . and the better our schools teach and practice the basic tenets of American democracy, the more chance there is for personal liberty as we know it to continue in these United States" (9: 147). He urged primary educational concern with behavior rather than with knowledge, and called for "a vast development of local centers for advanced education beyond high school," especially of public junior colleges and community institutes.

Hutchins (20) restated his well-known views on general education, and Hook (19) published a sustained attack upon them and upon their manifestation at St. John's. Donham (12), impressed by what he had observed in liberal arts and engineering school graduates who attended the graduate school of business administration of which he had been dean, offered specific proposals for a general education that should be integrated within itself and with special education, should develop habits of responsible choice, and should emphasize human relations. Jones (25), stressing the contemporary world crisis, proposed a reorientation of college studies "that may conceivably get us thru the next fifteen or twenty years." He recommended (a) professional or vocational training for all, (b) study of the theory of science and of the application of scientific discoveries to our technology, (c) study of the assumptions and writings

of representative government, (d) study of Russia and the Orient, and (e) study of personal relationships in modern society.

Particular College Programs

The Harvard committee had paid tribute, in its report, to the pioneer work in general education of Columbia dating from 1919. An appraisal of this experience, with recommendations for next steps, was published by the Columbia College Committee on Plans (6). The various courses constituting the program were described and evaluated, and problems of administration, instruction, facilities, and student life were also considered. The Columbia committee avowed its concern with the education of "the man of thought" so that he "may recognize the continuity of the explosive present with the historical past, and may intelligently use that knowledge . . . to develop his own later usefulness and happiness" (6: 90-91).

Full-dress accounts of a number of other types of general education program also appeared. Henderson first issued a general statement of the Antioch point of view (16) and later (in collaboration with Hall) a more explicit account of the program at that college (17). The end avowed was education "for the good life"—identified with democracy; the means a combination, "in new proportions," of elements of "(a) liberal education, (b) work experience, and (c) development of a sense of group responsibility." The development of Bennington was described and analyzed by B. Jones (24). Here the emphasis has been on student initiative and the creative aspects of learning, general education being thought of as "the education of the individual-as-a-whole in the culture-as-a-whole" (24: 119). Jones drew on evaluations of the Bennington program made for the college by A. C. Eurich and J. H. Cornehlson, Jr.

The special influence of the junior colleges on thought and practice respecting general education has, of course, been considerable. Many would assign terminal responsibility for general education to this type of institution. Sexson and Harbeson (34) represented this point of view in their study of the "New American College," their name for the four-year junior college. The Pasadena Junior College served as their main example, its character as a publicly supported community institution being emphasized. The authors said:

The core curriculum of the New American College may be defined as that group of offerings or body of educational experiences which are so essential to all students, regardless of ultimate educational or vocational plans, that they should be required . . . for graduation. The theory behind it is that certain areas of human need are common to all mankind and that training is required for a satisfactory adjustment within these areas. (35: 242)

The experience and conclusions of another junior college, Stephens, are reported by Johnson and others (23). Here general education for women is the explicit focus. The program developed has been based on

a sustained program of research (under the direction of W. W. Charters) respecting women's needs and the effectiveness of various educational ways of meeting them. Johnson described the program in detail as well as the instruction relating to the humanities, marriage, civic leadership, and communications. The use of clinical technics in education was treated, and the values of extra-class life.

Jarvie (11) described the pattern of general education developed for use in New York State's new Institutes of Applied Arts and Sciences. This pattern is woven out of "basic ideas" in modern science and technology, social science, communication and communication arts, and personal and community health. There is an effort at coordination among the applied general courses, between general and technical courses, and between school activities and community activities.

Many other colleges besides those specifically mentioned have, during and since the war, undertaken to improve their general education programs as reference to the recent periodical literature will reveal. (Consult the heading, "Curriculum: colleges and universities," in the *Education Index*.)

Various Analyses

Recognition of variations in attitudes toward, and approaches to, general education led Charters (5) to produce a useful systematic classification of "psychological patterns," "subject patterns," and "needs patterns." He favored a form of the latter.

McGrath dealt with the purposes of general education (29) and the factors influencing its development (28). Mackenzie and Evans (27) undertook to clarify current confusions, conflicts, and misunderstandings and to set forth fundamental principles. They saw general education as "a continuous program of life experiences for all . . . [focused] on common needs, . . . interests, . . . problems"; "concerned primarily with people"; and accepting "as its chief responsibility the development of individual and group personality patterns that will free intelligence, and enable all persons to operate rationally in situations where choices and judgments have to be made." Biddle (3) saw the need for a religious and ethical orientation to general education in "a tragic era."

In 1944 Conant (10), speaking at Teachers College, Columbia University, urged the desirability of a "truce" between educators at the secondary school and college levels in the interest, among others, of the development of better programs of general education. As a consequence Teachers College established five joint committees which reported their findings (13) two years later. Three of these committees discussed general education. The first (T. R. McConnell, chairman) dealt with "general education [as] a primary function of a comprehensive school system" (13: 213-18); the second (C. Leslie Cushman, chairman) with "the

character and purposes of general education" (13: 233-38); and the third (Karl W. Bigelow, chairman) with general education as an integral element in teacher education (13: 242-46).

General Education and Teacher Education

Marked interest in general education was shown by those chiefly concerned with the education of teachers. The topic was extensively dealt with in the reports of and to the Commission on Teacher Education of the American Council on Education (2, 7, 8, 33, 35).

Among the Commission's conclusions were the following: that at least three-eighths of the undergraduate work of prospective teachers should be aimed primarily at the objectives of general education; that such work should be spread thruout the four-year program; that it should be organized into relatively large blocks of time, with a conscious effort to increase integration, continuity, and flexibility; that it should include attention to the arts; and that it should be designed to facilitate balanced growth of the prospective teacher as a whole person and the development and strengthening of democratic powers (7: 112-17). Cooper (11) and Bigelow (4) gave further attention to general education for teachers, the former writing with particular reference to developments in colleges of liberal arts.

One of Jones' (25) major concerns was with the preparation of college teachers who could be expected to do superior work in the field of general education. This problem had also been recognized in the Harvard Report (15). More light was thrown on it by Hollis (18) as a result of his study of holders of doctor's degrees. McGrath (30) also analyzed "the chief obstacle in the development of general courses, namely, the shortage of teachers prepared for such instruction."

Some Special Topics

The importance of direct experience as part of the work of general education was emphasized by various of the writers already mentioned (2, 7, 8, 13, 16, 17, 22, 23, 24, 33, 35). Lynd (27) dealt at length with field work in this connection, basing her discussion on the program at Sarah Lawrence.

Evaluation in general education was discussed by Troyer and Pace (35) on the basis of experience with the Commission on Teacher Education and elsewhere. Pace (32) has more recently summarized the problems and useful technics. Troyer and others (13: 269-86) have provided inclusive recommendations respecting records and reports in general education.

Customarily administrative arrangements at the college level, notably those relating to departmentalism, have often served as obstacles to the development of new programs of general education. This was noted by several of the writers already mentioned (2, 6, 7, 12, 15). Griffith (14)

gave particular attention to the administration of general education, concluding that "little progress will be made in programs of general education which are indigenous to the whole institution until its horizontally adjusted task forces are given both administrative and budgetary authority."

In concluding, note should be made of the appearance, in October 1946, of a new *Journal of General Education* (published by the State University of Iowa, Iowa City, Iowa) and the announcement, for early publication, of the reports of the Cooperative Study of General Education of the American Council on Education. Thus the period under review closed, as it had opened, with significant evidence of the mounting concern with general education, and of the increasing systematic study of the issues and problems related to it.

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CHAPTER II

Intergroup Education

LLOYD ALLEN COOK

FIRST impressions of "intergroup education," "intercultural education," "educating for better human relations," and the like, are of a vast literature, recent in origins, increasing rapidly, widely disseminated, moralistic and promotional, and above all, badly confused in aims and practices. It is, for the most part, a goodwill literature, urging everyone to be decent, to act *right*, to act *now*. Beneath this world of words, one senses the great vitality of this newest era in social education, a growing desire over the nation by school and agency people to make inquiries, shape units and courses, direct community action, and at times pause long enough to appraise results.

Our interest here is a research interest, a study of what intergroup education is, how it works, rather than what it should be. And yet it should be said that any effort to organize research findings implies a schema, a framework, so that one must necessarily advance some conception of the field. Except for a brief overview (29), no appraisal of the field has appeared in the REVIEW OF EDUCATIONAL RESEARCH. Murra (52) and Edman (25) summarized current materials of use to schools, and Rose (60) has done a good job of analyzing studies bearing on the reduction of prejudices.

Nature of the Field

Definition of any field of thought and action is at once a philosophical, a scientific, and a semantic problem, a matter we can only recognize in passing. Judging from some years of observation, mainline interests in intergroup relations are five in number: (1) agencies, conferences, leagues, and bureaus, (2) schools, colleges, and adult education, (3) church departments, (4) mayor's councils on unity, democracy, etc., and (5) state education departments, commissions, and committees.

Aside from a one-group concern (for example, creed, race) versus an inclusive concern, the above bodies differ mainly in language patterns. Some take one label, or advance one set of symbols, some another. Underneath, all are interested in democratic human relations, in full citizen rights for all minority peoples, and in indoctrinating youth along these lines. Research, while present, is of lesser importance by far than ameliorative effort, with most studies best defined as "action research" to further a particular program. Much university research is, of course, an exception.

So far, no single definitive concept has been found to ticket off the exact center of balance in the group relations field. Education connotes a set of operations which differ from religion, as direct action (70) differs

from both. The real rub comes elsewhere. Intercultural, a much used term, must have to do with cultural elements, for instance dress, language, and conduct codes. Thus the label falls short if one's chief interest is in people, how people treat people. Intergroup bespeaks a concern for people in associated living, yet it fails to include two further foci, each of great importance: intragroup behaviors and personality. Human relations is so broad in sweep that it covers up emphases in concrete programs, for example race and creed. From this viewpoint, too, one is likely to slip into a "needs approach" to intergroup problems, a casework or psychiatric effort to adjust the individual, ignoring culture as a cause of human suffering, ignoring also cultural change via groupwise action (31).

To us, *intergroup education* would seem to be the best covering concept. As defined in an experimental teacher-training project (13), intergroup education is an effort "to improve teacher education by furthering a self-initiated trend, the better understanding of human relations in and about the school. Our primary concern is with the nature, workings, and effects in child and adult life of race, creed, immigrant cultures, income levels, and rural-urban heritages."

Whether a student works on one, or all four, of the above axes of human interaction, he will want to know how our society is structured. He will want to know how young people are processed in these forms and norms of living, how they come to hold the views and values they possess. At this point, his interest might well turn to school and other programs for the reduction of prejudices, the teaching of equalitarian intergroup relations, the democratizing of our common life. In all of this, the student will carry along a concern for group study and management technics, for it is these "study-action" methods, rather than specific factual findings, which give to intergroup education a lasting place and function. It is along these lines that research will be reviewed.

A Theory of Society

Two new leads, each well grounded in empirical research, provide broad points of departure for countless specific studies of so-called majority-minority group relations.

One lead is the vast collection of materials, their analysis and interpretation, made by Myrdal (53) and associates, in all six volumes. To this Swedish social economist, "race relations" in this country are a moral issue. With over-simplification, what he seems to say is, first of all, we are a democracy. This is evidenced in the way average citizens think and talk and act, under influence of high national ideals, laws, and Christian precepts. Next, we do not practice what we preach, with groupwise fears, hatreds, exclusions, mistreatments, all about us. Now one cannot believe something and not act it out, without paying a price. The price we pay for white domination of nonwhite peoples is a bad conscience or else a deep-going unconscious guilt complex. At the conscious

level, our escape is to rationalize, to explain away "the Negro problem" by saying that it does not exist. Lower down, in the subconscious, we develop escape mechanisms, for example aggressive behaviors. The thing to do, the author holds, is to integrate color-castes into our body politic at an equality level, and the way to do it is, in the main, thru "mass education."

Myrdal may indeed have misjudged the complexity of our culture, projecting his own life experience in small, fairly homogeneous Sweden. He may also be at fault in, apparently, explaining all Negro counter-aggression within the race and outside, as a reaction to white discrimination. And yet, all things considered, he has integrated many so-called "contributions to knowledge," made moral sense of otherwise meaningless studies, and put us on the track of values in life and in science. Field tests with twenty teacher educating institutions (13) showed that educators took readily to these viewpoints and, within limits, tried to implement them in action.

The second lead, and far more productive of identifiable research studies, is the caste-class hypothesis as advanced by Warner (69). What Warner sought to find in the now famous "Newburyport (Mass.) Study," was an organizing principle by which the community itself survived. In his words, "all societies seem to place emphasis on one structure which gives form to the total society and integrates the other structures into a social unity." This principle was founded in "a caste-class system," a kind of hierarchical order of superior and inferior status positions. Caste, in this sense, is not to be confused with its Hindu usage, nor is it a Marxian self-conscious grouping. It is simply a concept, a way of looking at people, identifying them by color and lineage and, in our society, penalizing them if they are nonwhite by exploitive action and denial of privilege. Social class, on the contrary, is a much less rigid status order, much more determinative of community integration. Found on both sides of the caste line, individuals move up or down the class ladder thru ability, initiative, luck, and circumstances. Mobility is not easy, and is never great, being manifested in the areawide rating given to an unknown number of cultural factors, for example one's job, ancestry, residence, friends, and education.

Warner has been severely criticized for his statistical methods in stratifying the Newburyport population. He has been charged with underestimating the fluidity of American life, its competitive urban character. More serious, perhaps, he has made class a localistic concept, defined by the value judgments of a given spatial area, hence not readily transferable to other areas. Yet, withal, students have made much use of his hypothesis, with (18, 71) or without modification. Whether we view our way of life as a caste-class order, or as a "success system" as the Lynds suggested in their first *Middletown*, the idea itself throws much light on what one can see and infer about people—their struggle to get ahead, rewards of effort, disadvantaged individuals.

Socialization of Children

Whatever a society is like will be reflected in its children. Davis and Dollard (19), in a series of case studies, made the first systematic application of the caste-class point of view to child rearing. This study has been followed by more than a score of substantial inquiries, some not published (55). Most illustrative is the Davis and Havighurst (20) survey of about 200 Chicago white and Negro middle and lower class mothers, with the sample divided into four equal groups. Significant statistical differences in child rearing were found as between classes and colors, with the former more important than the latter. Class level agreements, in spite of color differences, were conspicuously present. Among inferences drawn from tabular data are that "middle class practices make children too anxious, too frustrated, for the best mental health," and that lower class levels, again regardless of color, "provide for children a less strict regimen," a more permissive environment, for personality development.

Davis (18) in particular, Davis and Havighurst (21) and Warner and Havighurst (69), have made significant contributions to a systematic sociological theory of child development. While their thought shows the influence of anthropological studies of role, status, and position, which are (aside from motivation) the actual mechanics of social learning, they make less use of these concepts than one might expect (22, 23). Much the same can be said of the Mead-Cooley-Dewey idea of the "self."

An obvious phase of child socialization, and underrated in the above inquiries, is the *group life* of children. This is not the same as "peer cultures," altho the group is the prime agency for their transmission. What is meant is that the group per se, its forms and norms of being, becomes an object to the child, a thing to dream about, fixate on, act toward, escape from, hence a powerful educative experience. Here the work of Anderson (3), Cook (11), Jennings (41), Lewin (47), Smith (63), Whyte (74), even the insight of novelists (51, 62), becomes significant. From such studies, one learns many things: types of groups in child life, age-sex sequences, area influences. One learns how groups get started, enlist a following, develop leadership, organize action, define roles, assign status, discipline members, maintain morale. We are beginning to learn too what can, and cannot, be done to change group structure.

Prejudice, Nature and Control

"Attitudes, attitude tests, attitude testers!" exclaims Ford (27), as he adds one more study to the 2000-odd published in the last twenty years. If there is any exact center to intergroup education, it is the cluster of attitudes called "prejudice." Or better said, since prejudice is no simple matter, it is the pattern of attitudes, objects, values, and behaviors which leads some people to dislike other people en masse, to fear and hate them,

to act in ways that symbolize their less-than-humanness. It is the prime purpose of intergroup education to remove prejudice so far as that is possible, to teach people to treat others in terms of personal worth.

What prejudice is, its first appearance among children, what causes it, how it varies with age and sex and in time and place, whether it can be controlled, have been objects of much research. Bruno Lasker (44), two decades ago, reported ethnic prejudices in children aged five to six and argued, mostly from subjective data, that such viewpoints are acquired, not inborn. Ten years later Criswell (16) reported the first sizable, systematic study of children from the kindergarten thru the eighth grade, three-fourths of whom were Negro. By sociographic charting, she found that cleavages between the sexes were, withal, more pronounced than between races, that whites did not withdraw from association with Negroes before the fourth-grade level and do not group up before the fifth. Negroes began to withdraw from whites by the third grade, tho at no grade was racial separation complete. Using a "faces test," a set of mixed photographs, Horowitz (35) found a definite color bias from the kindergarten on up, with own color choices peaking at upper grade levels. After corroborating these findings in another community (36), he explained disagreement with the Criswell work on the basis of differences in community backgrounds or else as due to his own more sensitive study technic.

Meltzer (49) found ethnic antipathies well formed by the fifth grade; Blake and Dennis (5) reported "bad trait stereotyping" of Negro children by whites at the fourth-grade level; Radke (58) discovered that white Gentile children, who had had no direct contact with either Jews or Negroes, had "strong prejudices" toward them by the age of nine years. Allport and Kramer (2) found that prejudiced white college students had unpleasant memories of ethnic group contact dating back to the ages of six to sixteen. Only a fourth of this sample reported their first anti-Jewish feeling after the age of sixteen, a fifth their first anti-Negro feeling.

In view of the evidence, it is unsafe to say what research shows as to the age at which negative feeling toward ethnics first appears, of what it consists, how it varies with social class level and personality structure. Much of our uncertainty is due to faulty study technics, with promising work now appearing on the equal-*i* type of scale (54) and the zero point (32). Unclarity is due also to a great deal of "mote beam" thinking (41), the imputation to others of shortcomings in ourselves. A third stumbling block is the word prejudice. Used to mean anything from vague mistrust thru well-formed imagery to contactual avoidance and big muscle aggressions, the concept has lost utility for scientific purposes. Nobody knows what it means, and it should be abolished as a communicating symbol. We need to speak about what children do, how they behave, what they say, all in reference to exactly defined situational stimuli.

A small but precise inquiry of the kind suggested is Seeman's (61) work on eighty-one Negro children in three suburban third to sixth grade classes. He sought by means of friendship choices and interviews to discover the importance of skin color differences. After giving a social acceptance scale, the author used the analysis of variance to determine significance of choice. Younger children in particular preferred lightskin friends but did not on inquiry as a rule verbalize their preferences. Seeman's own cautious conclusion was that "color values may serve as a frame of reference for friendship choices long before these values become associated with the life tasks of childhood, or with the conscious status striving that comes at a later period."

At more advanced age levels, the situation is not quite so confusing. An earlier study is that of Young (77), in which college students in a race problems course ranked ethnic groups according to their assumed abilities. At the end of the course, the same test showed no change in ethnic-group rank order positions, a finding often cited as proof that instruction has no efficacy in changing attitudes. Student views could, of course, have become more favorable, with the whole scale shifting upward.

In respect to classroom instruction, Whisler (72) found significant end-test changes in two college social science classes. Ford (26), using Bogardus and Hinckley scales but with no control group, found marked shift in attitudes toward Negroes in his "race and immigration" course. Billings (4), using scales and a control group, found more liberal attitudes in his seminar and field trip group than among the controls, altho he noted the greater liberalism of experimental subjects prior to their experiences in the social problems course. Three years later, on the same test, liberal attitudes had decreased, yet were still more favorable toward the Negro than were control group responses. Some writers have reported no reliable change in ethnic attitudes as a result of field trip or personal contact experiences, whereas Smith (63), in one of the most exact pre-test and end-test studies to date, found large and significant change in favorableness toward Negroes (7.36 times its standard error). About two-thirds of the students who were retested eleven months after the experiment had kept their gains.

In an exhaustive review of school and college studies where efforts were made to change attitudes thru class instruction, field trips, audio-visual aids, etc., Rose (60: G-18) rated thirty-one of the attempts as showing change, sixteen no change, and nine indefinite. Presumably, change was in line with teacher expectation, not counter to it, as at times has been reported. His conclusion is that ethnic attitudes at the college level, while deep rooted and tenacious, can be changed by college instruction, a point of view with which the present writer fully agrees.

In addition to more sensitive testing instruments, we need better experimental designs. For example, what is a course, a field trip, etc.? What,

precisely, are its component elements, its stimulus content? Knowing this, we might then subject teaching technics to comparative test, with tremendous savings in time, energy, and costs.

The School's Conflicting Role

Time was when one had to speculate on the school's role in community life or else fall back on descriptive studies such as the work of Counts (15). That day is passing. On the one hand, some schools are working vigorously to reduce ethnic tensions, to democratize school life and learning. On the other hand, studies are beginning to appear which show some schools in quite a different role, that of transmitting to all children the viewpoints of the community power system. While we do not regard these studies as sufficient for any sweeping generalization, their data are extremely suggestive.

Best evidence of this newer research to school functions is found in the systematic analysis of Warner, and others (69), in case studies by Davis and Dollard (19), and in smaller statistical surveys (11, 28). In school attendance, choice of curriculums, pupil social status, teacher rewards and punishments, administrative control, board membership and operation, white upper class or upper middle class children are definitely favored. All non-white children in the schools studied, all non-native born of native parentage, all non-Protestant creedal groupings, are disadvantaged, as are most young people who live in urban slum areas. Bilinguals, wherever they are, face school adjustments the severity of which few teachers seem to understand (6, 43). A relevant fact of some worth has to do with school books in current use. Textbook authors in particular, judging from Wilson's (75) study of 413 volumes, aid and abet what one writer has called the "miseducative" process. In all, there is reason to believe that many schools and colleges are more or less aligned with the nation's caste-class order.

The type of data just reported is obviously subject to two interpretations. For one who assumes the worth of democratic ideals, any inequality in any part of the educational program is disapproved. Any admission of differences as between ethnic, religious, or income groups is viewed with suspicion, lest it be misinterpreted. There is a strong compulsion, as Woodard (76) noted, "to have findings come out on the exact dotted line of equal national, class, and racial abilities."

Equal abilities are not always true, if true at all, and the idea itself may be quite out of line with logical expectation. For instance, the higher the socioeconomic status of parents, the greater on the average the abstract intelligence of their children. Again, the greater the denial of privilege, the more the overt repression, the greater the probability of compensatory adjustments, such as bitterness, clannishness, shiftlessness, and crime. Thus a nation's people are not alike and equal. Differences en masse do exist, altho overlapping between studied populations is always pronounced.

It should be added that differences, so far as is known, are environmental and acquired, not inborn via racial heredity.

Running counter to the democratic ideal is the status quo viewpoint, the preservation of the present industrial-commercial power system. Schools are viewed as an instrument of this policy, a bulwark against any radical change. The school's chief job is to teach the intellectual tools of the culture, the technologies and physical science foundations, and certainly not to experiment in equalitarian living. Educate for continuity, for stability, for efficiency, not for new freedoms for some underprivileged group, new scope for initiative and achievement. Keep America a native white Protestant middle class business man's culture.

It has been noted that some schools are working vigorously at intergroup education and the statement needs brief documentation. Three books (1, 8, 10) have appeared on the so-called "Springfield Plan," not one of an objective research character. Taba and Van Til (65) have edited a social studies yearbook on school practices, and Taba and Wilson (66) have published an article on the nationwide public schools project which she directs. Cook (12, 13) has described procedures and given statistics on participation in the first year of the four year *College Study in Intergroup Relations*. Thirty-five study and experimental action groups were formed in the eight cooperating colleges, involving 429 staff members and school heads, with group meetings for the year totalling over 1000. City school systems (24, 48), mayors' councils (56), state and federal committees (9, 50), and intercultural agencies (45, 57) continue to publish pamphlet materials. In the writer's files are over 2000 of these issues, each dated since 1945. Progress reports (64) have begun to appear by the staff of a nationwide study, under sponsorship of the American Council on Education, of eighteen cooperative public-school systems.

Group Management Technics

Intergroup education, in all of its dimensions, is not unlike a pyramid. At the apex, we would put knowledge about people, who they are, how they live, what is known to be good for them. At one base would be study methods, including appraisal of any kind of planned program. At the other base we would put group management, the social process by which a group is guided toward the achievement of its objectives. In this phase of intergroup education, schools and colleges have much to learn from community group work agencies, church and civic bodies, labor and farmer organizations, adult education, opinion polling and publicity outfits.

Action for Unity (70) sets the frame, in an exploratory way, for consideration of recent "technic" literature. This little book is a hit-skip survey of mainline direct action agencies in twelve urban centers, plus the insights of its distinguished author. Of chief interest are seven core patterns of action: exhortation, education, participation, revelation, negotiation, contention, and prevention. Categories are overlapping, as they

would likely be in any classification. Each is appraised as to its effectiveness in reducing or preventing intergroup hostilities, with research needs in the forefront of the writer's thinking.

Several writers, for example Whyte (73), have criticized certain slum area agencies, especially social settlements, for their indifference to local leadership, a point pressed even more sharply by Hughes (38), tho no one of the writers deals in any adequate way with the difficult problem of moving away from imposed, paternalistic programs. Hughes' (39) description of "ethnic group knitting" in a factory situation, plus his strictures on management, and Hall's (33) account of how Negro soldiers fared in the armed forces, suggest new leads for experimental civic action. Houser (37), himself the experimenter, gives a good tho brief report on small-group tactics in opening restaurants to colored patrons, barber shops, skating rinks, swimming pools, and the like.

Action projects reported by schools are increasing in number. Brameld (7) found evidence of pupil group action, often teacher led, in a survey of seven urban school systems, as did Cunningham, et al (17), and Vickery and Cole (67). An intercultural committee (24), typical of such committees in every part of the nation, surveyed "promising practices" in Detroit schools, some being group action projects. A North Central Association committee (57), Cook and Forsyth (14), and Lett (46), have discussed group work strategies within the school framework. On the whole, the reports we have examined glow too much. Were the job half as easy as it is made to seem, it would be foolish to reiterate the need for trained leadership.

The Roman Catholic Church has a well known, well set up, well working, social action program. What about Protestantism? A survey by Landis (43) of the eleven largest denominations, accounting for twenty-nine of the nation's thirty-six million Protestants, showed that all had set up national staffs to foster Christian social action. Almost all of these denominations went on record as favoring church action in every area of our common life. The effectiveness of their work was seriously questioned. Programs were still embryonic, with state and national groups publicizing resolutions on the evils of the day. Staffs were not well trained, budgets inadequate, but the outlook appeared hopeful. The situation was regarded as a challenge to any social scientist interested in helping out.

Retrospect and Outlook

For perspective on the trend in education under review, one should perhaps have worked in the field as late as a decade ago. Newspapers did not editorialize on the subject. There were few good books and fewer movies such as RKO's *Crossfire* and *Gentlemen's Agreement*. Goodwill and good neighbor commissions were almost unknown. Schools, by and large, were indifferent, churches well adjusted to the caste-class system (30), college courses quite academic, labor unions with no great power.

Research went on, much as now, but without the present exacting self criticism and improvement. It was the war that turned the tide, the need for productive and defensive unity. Since then, in spite of backwashes, the nation has been aroused. Warm discussions can be heard on almost any street corner, in Pullman car washrooms, around bridge tables, in exclusive clubs. Intergroup relations has become a big business. At last count, there were 150 goodwill and good neighbor organizations at work in the nation (12), spending about 20.7 million dollars a year, each with an "educational" program.

What is the educational researcher's interest in all of this? It is, in the main, to assist in the understanding of intergroup relations in and about the school, to analyse their effects on individuals and the community, and where possible, to bring these behaviors by experimental action into line with democratic ideals. Thus the scientist should be an invaluable ally to any effort by school or agency to engineer social justice, equal rights, or whatever the educational objective happens to be. In this sense, science would function in society as the reality principle does in personality. Whether or not a society, or even a representative community, can ever be led to face reality, and what would happen to its members if it did, is a question of great importance and complexity. It is only as we move deeper into the function of "prejudice" in personality structure (34), multiply and coordinate efforts, that we shall ever know the answer.

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CHAPTER III

The Social Studies

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A REVIEW of educational research involves an attempt to establish criteria of selection by means of which research studies may be identified. Establishment of such criteria, difficult in any area, is especially difficult in the field of citizenship education. Englehart (32) in presenting suggestions with respect to experimentation under school conditions offers the usual concept of research dealing largely with statistical interpretation, single variables, and controlled conditions. Judged in the light of this concept research in the teaching of citizenship is almost nonexistent. There is need for careful statistical research in citizenship education. Yet the quest for social wisdom necessarily involves insights derived from philosophical considerations which inevitably must be value judgments concerning relationships among human beings.

The social sciences are radically different from the natural sciences in that social causation and analysis are radically different. Every social fact must be analyzed in a body of meaning and interpreted in terms of our own social philosophy. That philosophic consideration of human values is basic in citizenship education is revealed in such publications as *Education in a Free Society*, *Education for All American Youth*, and *Educational Services for Young Children*.

The Social Studies Curriculum

The nature of the task confronting education in the social studies is indicated in the Twenty-Third Yearbook of the American Association of School Administrators (2). The need is indicated for teaching appreciation of America's past and instilling faith in America's future, and for developing self-control in pupils, a realistic attitude toward change, constructive attitudes toward the operation of government, and spiritual and ethical values. Crary (22) listed training in critical thinking, development of attitudes and teaching of democratic human relations, creation of a constructive world outlook, and teaching the implications of atomic energy as among the challenging areas in the social studies curriculum. Beery (12) investigated currently held conceptions of democracy and found a vast majority in agreement upon respect for the individual, equality, reliance upon rational methods, liberty, and faith in the common man. Inconsistencies and disagreements, however, appeared in the application of principles.

Courses of Study

Meredith (60), in a secondary school curriculum survey, found great diversity in course offerings and reported the disappearance of ancient, medieval, and modern history courses in line with the increasing popularity of the one-year World History course. Increased emphasis was given to the Pacific, The Far East, Russia, Latin America, International Affairs, Economic and Social Planning, Global and Air Age Geography, Intercultural Relations, and Community Study. Haas (41), as the result of a questionnaire study in Wisconsin, also reported the almost complete abolition of ancient, medieval, English, and modern history, and the wide adoption of Problems of Democracy as an integrating course in the last two years of the secondary schools. Haas also reported that about one-fifth of the curriculum was devoted to the social studies. Barton (10) found that in New Jersey high schools, smaller schools gave greater attention to social studies than larger schools and that there was a tendency to give pupils of less academic ability greater amounts of time in social studies courses.

Storm (78) reported from an examination of twenty-one courses of study that great emphasis was placed upon democratic group living thru symbolism, holiday observance, biography, and direct teaching of intercultural relations. Baker (7) analyzed written questions of elementary school children and reported great diversity of interests, with animal life, war, and curiosity about the human body prominently mentioned. Little interest was found in the local community.

Scrafford (73) experimented with paired groups in English and civics at the ninth-grade level. He discovered that with separate classes in English and Civics, but with the work correlated, there was a slightly greater gain than in completely separated classes. Greater gains were found where one teacher conducted both English and civics classes, and the most positive gain occurred where both teachers were present for a double period.

Five studies investigated specific aspects of the course of study. Shaw (74) presented for emphasis a list of 500 names which were selected by analysis of periodical literature. Steinberg (77) concluded from a textbook study that "The really great statesmen of the Washington, Jefferson, Hamilton, Lincoln stamp were frequently treated obliquely, the soloist was drowned in the accompaniment." Technics of education regarding installment buying were studied by Rondileau (70) who found that consumers did not possess sufficient knowledge, and made suggestions as to content and grade placement of consumer information. Barnett (9) by use of pre-test and final tests found that pupils knew 15 percent to 80 per cent of material before the pre-test, and after studying units knew 32 percent to 100 percent of the items covered. He concluded that, on the basis of the evidence presented, curriculum material should be suited

to a range of abilities if our present classification technics continue to exist. Junge (50) submitted a list of concepts and generalizations in geography to geographers and to public-school teachers. She found general agreement as to concepts and generalizations to be taught on physical and economic geography and wide divergency on factors of political and social geography.

Community and Regional Resources

Significant emphasis upon study of community and regional resources is found in the literature. Ivey (46) presented regional development as a problem of relationship and suggested education for scientific resource management. Hansen (42) observed that "we have had ample demonstration during the last two decades of the chaos that does result from a highly centralized, industrially dominated 'culture' in which human beings are treated as fragmentary parts of society, never as whole human beings participating as such in that society," and reported the Montana study launched in 1944 by the state board of education as a program of activated research in human resources consisting of a number of experimental studies now under way in several small communities thruout the state. Dabney (24) took residence in a small mid-western community to study how the community prepared young people for citizenship. She concluded that "community life did not bring young people into intimate association with leaders in government, business, and the professions. . . . Young people had no reason to feel that they belonged or were an integral part of the community." Bates (11) found that industrialists, youth, and citizens generally favored greater emphasis on social education, democratic principles, and citizenship education.

Student Achievement and Opinion

Six studies reported were devoted to measurement of achievement and opinion of students. Abraham (1) in an attempt to measure effectiveness of American history courses on the high-school level found that the poor members of the thirteenth grade did as well as the average of the eleventh grade on an American history test indicating that eleventh and twelfth grade instruction had been to some extent at least effective. He also reported a low level of knowledge about institutions and procedures of the social environment. Dimond (26) studied the governmental attitudes of high-school seniors and found a wide range of governmental attitudes, and that there was no indication that a large proportion of students was either extremely cynical and critical or extremely idealistic about the conduct of government. High-school seniors were found to be idealistic about many governmental matters and cynical about few matters, but few high-school seniors (15 percent) expressed the desire to become candidates for public office in later life. Gates (38) discovered a connection between academic ability in subjectmatter areas dealing with civic information and willingness to accept civic responsibility. Bolton (15)

reported a significant correlation between growth in social studies vocabulary and the number of social studies courses taken. Burkhardt (17) found that high-school students knew fewer salient facts about the Soviet Union than facts of secondary importance, and that there was a relationship between the amount of information possessed and the opportunity to study the Soviet Union. A comparison of mean scores of various groups on age, length of school year, classrooms, class size, size of school, departmentalization, etc. was reported by Eaton (30).

The Learning Situation

The Pupil

In any discussion of teaching and learning, primary attention must be focused upon the pupil who is modifying old behaviors and acquiring new patterns of behavior. The Forty-Third Yearbook of the National Society for the Study of Education (64), Part I, presents a compilation of the recent information about adolescence. The Fifteenth Yearbook of the National Council for the Social Studies (63) similarly brings together useful information on adapting instruction to individual differences. Gerlach (39) found that Texas teachers, recognizing the infinitude of individual differences, did not want homogeneous grouping in their classes, but did want an opportunity to estimate pupil effort at grading periods.

Teacher-Pupil Relationships

Thompson and Hunnicutt (80) found differences in the reaction to praise and blame between introverts and extroverts. Repeated praise increased the work output of introverts more than blame, conversely, repeated blame increased the output of extroverts more than praise. Potter (68) had earlier shown a difference in the effectiveness of reproof in relation to age in school children. The experimental, or reproof group, showed impaired performance in grade three, improved performance in grade six, and little change not due to practice in grades nine and twelve.

Pupil's Interests

Out-of-school interests of pupils vary markedly. Dyer (29) reported that of 200 students selected from 2000, the average pupil reads eight books besides those assigned. He attends one movie per week; may attend five or more religious services per week, altho four attended none. The average student spent two hours per day for study, three hours listening to the radio, and thirty minutes reading the paper. Feingold (33) studied the newspaper interests of high-school pupils and reported that of 722 pupils in grades nine to twelve, 3 percent read no newspaper at all, 78 percent read the paper at home, 69 percent read more than one paper daily, 51 percent spent fifteen to thirty minutes reading the paper, 26 percent spent up to sixty minutes, 23 percent spent more than one hour. Fendrick (34) found that among high-school and college students about

half read the newspaper regularly, and that there was a preference for photographs, comics and cartoons, sports and entertainment, foreign and travel news, in that order. The students disliked financial news and speeches. Girls preferred book reviews, religious news, poetry, scandal, and society items.

Reading and Learning

Witty (88) reported that much of the Army experience in reading is valid for postwar school reading since successful practice was based upon good school theory. Functional methods and materials, visual aids to accelerate learning, strong motivation, clear objectives and specific purposes, integrating and correlating all activity, small classes, supplementary materials, demonstration, and applicatory exercises were all found to be highly successful. MacLatchy (57) found that when Navy visual form training was used in schools, children improved significantly in learning to read as compared to those in the control group.

Scope of Learning Opportunity

Some attention has been given recently to the adequacy of materials of instruction especially in terms of teaching international relations. The American Council on Education has sponsored several examinations of textbooks to determine what they do and do not say about our international neighbors. Two of these studies on Latin America and Asia which were under the direction of Howard E. Wilson, have already been published. Hart (43) in a summary of the findings of a study of *Latin America in School and College Teaching Materials* indicated that textbooks contained inaccuracies and prejudices, but not conscious antagonisms. *The Treatment of Asia in American Textbooks* (83) reiterated that other lands and other peoples are not well known to American writers, with the result that writers tend to rely upon stereotypes and outworn generalizations; that the presentation of other lands and populations is regularly brief, uneven in emphasis, and condescending in tone. McLendon (58) concluded from a textbook survey that the South as a region generally received an insignificant amount of space in social studies textbooks. In five American history textbooks studied from 4.5 percent to 10 percent of the page space specifically concern the South, and that most of the references to the South applied to the period before 1875. Hauck (44), from a test of student knowledge of United States and Canadian textbooks, found students inadequately informed about Canadian-United States relations and that most textbooks do not provide adequate coverage on this subject.

Procedures and Outcomes

From answers to a questionnaire on current instructional problems in secondary-school social studies, Michaelis (61) reported that the most

important problems were clarification of objectives, identification of procedures for achieving major outcomes, and the evaluation of the aims of instruction. Altho there is some evidence to the contrary [see Lippitt (56)] Jayne (48) was unable to find any relationship between teacher acts and pupil gains. Doll (27) found that pupils had well-defined attitudes toward teaching procedures as revealed in a questionnaire which used a continuum marked from laissez faire thru democratic to authoritarian classifications of methods of teaching. Pupils preferred democratic procedures, appreciated guidance but not thwarting of their creative impulses, and found more flaws in conventional teaching than did teachers. Friedman (37) found that pupils did not agree among themselves as to the best way to learn dates. He concluded that pupil interest must be supplemented by factors of learnability and utility as determined by the teacher. Traxler (82) could find no significant differences in the knowledge of facts in United States history among students from schools with progressive or conservative educational outlook. Schoefield (72) found boys to be more persistent than girls in a learning situation, a positive correlation between persistence and average achievement, and an association between underachievement and factors of restlessness and less persistence. Anderson (5) reported that eighth-grade pupils who had home study assignments made significantly better scores on tests covering the material studied than did pupils who did not study at home. Gorman (40) found that 80 percent of elementary-school teachers reported that discussion was the most effective method and that the project method and directed study were favorably mentioned by teachers. Knower, Phillips, and Koeppel (52) found that silent reading was a more effective means of learning than listening to a speech, competent speakers were more effective than untrained ones, and when visual aids were added to a speech the contents were more easily remembered. Jayne's (47) experiment with lectures and silent films as teaching devices showed visual experience alone to be least effective, a combination of both superior to either one alone. Stutz (79) concluded that, in terms of understanding of concepts involved, classes did not make significant gains in understanding when their study of verbal material was aided by the addition of textbook illustrations. Wrightstone (89) reported the superiority of the activity program in the elementary school in achieving attitudes, interest, critical thinking, and initiative, and also equal effectiveness with longer established programs in attaining other educational goals such as basic skills. Torrens (81) reported the usefulness of current events discussions in creating pupil interest which carried over to other classroom work.

Measurement and Evaluation

Much of the material in the field of measurement and evaluation in the social studies appears in general studies. While the entire February 1947 issue of the REVIEW OF EDUCATIONAL RESEARCH is pertinent to the social

studies, the chapter by Ellis and Gerberich (31) is of special interest in its summary of studies in the areas of interests and attitudes. McNemar's (59) review of opinion-attitude methodology includes valuable references for further study in the measurement of attitudes, and the general work of Remmers and Gage (69) on educational measurement and evaluation contains methods and technics on the evaluation of attitudes and related aspects. The most recent comprehensive survey of measurement in the field of social studies is that by Anderson and others (4). Their organization and statement of objectives as they relate to measurement are especially worthy of further study.

Studies of Published Tests

The content and validity of specific tests have been investigated in several studies. Two reports deal with the United States Armed Forces Institute Tests of General Educational Development: Bradley (16) presents data in support of the validity of the section on the Interpretation of Reading Materials in the Social Studies with the criteria of validity being grade point averages, number of hours of study the testees have had in social studies, and grade placement; Donahue (28) reports, among other norms, those of students of the University of Michigan on the section on the Interpretation of Reading Materials in the Social Sciences.

Chauncey (19) described the purpose, nature, and content of the Social Studies Test of the College Entrance Examination Board and on the basis of a study of 650 students concluded that "the social studies test has as high a correlation with freshman grade averages as the Scholastic Aptitude Test of the College Entrance Examination Board."

The nature of the content of standardized tests is analyzed in two studies. Neill (66) in an examination of 155 standardized tests in general use in the United States (all published within the last five years, 1939-44) to ascertain the nature and extent of the materials in these tests dealing with Latin America found that few of the tests dealt with the people of Latin America and that scant attention was paid to their customs and living conditions. In an analysis of seven standardized tests of American history to determine the extent to which the tests emphasized the representative dates and persons mentioned as important in the Wesley Report, Park (67) found that these dates and persons were not emphasized and that in some of the tests examined they did not even appear.

Measurement of Newer Values

Attempts to measure newer values in the social studies are continuing and are reported in several studies. Williams and Abraham (87) described the construction of one of the examinations prepared for high school by the Examinations Staff of the Armed Forces Institute and expressed the belief that the test is a useful contribution to measurement of often neglected objectives of the social studies. They concluded that the test meas-

ures the ability to reach valid conclusions. Friedman and Marti (36) reported that the general understanding of time concepts is positively, but only slightly, related to the factors of grade level, intelligence and semester grades in world history, but systematic instruction in time concepts did result in significant improvement. Anderson and others (3), summarizing an experiment in teaching certain skills of critical thinking, discuss briefly the test materials used for the evaluation of these skills. Both Lindsey's (54) and Wrightstone's (89) studies include valuable suggestions for developing evaluation technics useful in appraising outcomes of elementary education. Horrocks' (45) study of the relationship existing between knowledge of fact and principle about human development and the ability to apply those facts in diagnosis and remediation presents a useful technic for the evaluation of an important objective of social studies instruction.

Of the many studies not directly concerned with evaluation in the social studies, four may be reported for their values in the improvement of testing technics in all areas. Tyler and Chalmers (84) reported that warning pupils before a test had very little effect on test scores; Curtis and Darling (23) found that "new type" true-false tests were more reliable, more popular with the students, more discriminating, and eliminated the element of chance; Detchen (25) suggested that interest or activity items on an interest inventory may be used for another purpose than that of occupational analysis and indicated that student performance is a combination of more than ability and past performance in a field of study; Angell (6) studied the effect of the immediate knowledge of quiz results on final examinations and found significant gain as a result of the immediacy of knowledge.

Human Relationships

Intergroup Relationships

Research in the field of social relationships may be divided into two groups: studies of intergroup education and studies of social relationships within the group.

The Sixteenth Yearbook of the National Council for the Social Studies (62), while not a research study, is valuable for its presentation of promising practices in intergroup education in the social studies and may be read with profit for its wealth of materials and numerous references to recent research in intergroup education. Bolton and English (14) in their study of attitudes about war and peace describe a technic for appraising attitudes as a basis for curriculum adjustments. Several studies shed light on the problem of modifying or changing attitudes, suggesting that the task at best is a very difficult process and that current educational methods must undergo drastic revision if change in group attitudes is to be effected. Chein and Laks (20) studied attitudes of subjects within a precinct area and concluded that ". . . you cannot deal with these prejudices by develop-

ing the intellect or by acquiring knowledge." Smith (75) expressed the opinion that war did not provide an education in internationalism because as individuals we were unprepared to benefit from it and charged that the schools have provided virtually no basis for the proper appreciation of other peoples. That there is some hope for modifying attitudes thru the educational process was reported by Smith (76) in a study describing the changed attitudes towards Negroes resulting from brief professional and social contacts of white students with cultured Negroes. Russell and Robertson (71) also reported the effects of assembly programs and reading and discussion of materials on the attitudes of junior high-school pupils, finding some favorable changes in attitude but concluding that teachers' attitudes and behavior were the most potent influences.

Social Relationships within the Group

The nature of social relationships within the group has been investigated by a number of studies, chief among which is that of Jennings (49) who analyzed the sociometric choice processes and the interrelationships involved in leadership and isolation. She concluded that leadership and isolation are the products of interpersonal interaction rather than attributes within persons, and that both leaders and isolates vary widely among themselves in personality traits but as a group are differentiated by their capacity for interplay with other personalities. In a study of social class and friendship among school children Neugarten (65) reported that friendship status and reputation of school children in a typical middle class community are found to parallel social class positions; Cook (21) in a study of the friendship structure of a group of tenth-grade pupils found that the friendship structure for each semester remained fairly stable and that in general all of the sociograms showed the upper class children to have been over-chosen. The nature of popularity was investigated by Young and Cooper (90) who found that the factors significantly related to popularity were extroversion, sense of personal worth, and a feeling of belonging. They also reported that facial expression is associated with popularity more closely than is appearance of clothing. Kerr (51) describes an experimental study using the sociometric technic in determining the status of individuals in a fifth-grade group.

The problem of influencing social relationships within a group was studied by Link (55) who contributed several significant findings in regard to the measurement and development of leadership and social effectiveness and stated two important implications of his study for citizenship education: ". . . there is no correlation between social intelligence and social effectiveness" and "[there is] the necessity of an almost revolutionary change in the present educational system." Flory, Alden, and Simmons (35) in an experiment to determine whether classroom teachers can improve the personality adjustment of their children found that, measured by the California Personality Test, significant improvement was obtained

by the teachers concentrating their efforts on twenty-six pupils who had shown poor adjustment on the test. An experiment in the modification of social relationships reported by Van Til and Rath (85) indicated that social travel can decrease social distance and contribute to the development of common concerns and the fostering of associated living.

Teacher Education

An increase in the offering of geography courses in teacher-education institutions in the United States was found by Bellotti (13). Landsittel (53) reported a study of the needs of secondary school social studies teachers in which American history, European history, community government were found to be most important in the schools and also made recommendations as to the major needs in graduate work. Baker (8) found that teacher-education institutions located in metropolitan communities are favored in developing programs in intergroup education and recommended democratic environment, field experiences, lectures and forums, and courses in anthropology in teacher-training institutions. In another survey of colleges Caliver (18) also reported the inadequacy of facilities provided for teachers in learning about our minority groups and about intercultural education. Lippitt (56) used two equated classes of students in a teachers college to determine basic elements of a sound teaching process. The experimental group, in which the class determined technics, rules and regulations, achieved greater insight into problems of classroom leadership, worked harder and developed greater skill than did the control class using a reading and lecture method. A study of the effectiveness of supervisory technics was reported by Von Eschen (86) who found greatest growth in achievement in some of the less traditional educational objectives such as silent-reading ability and basic-study skills.

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CHAPTER IV

Adult Education for Citizenship

HOWARD Y. McCLUSKY

THE case for the education of adults for effective citizenship is overwhelming. In a society based on the consent of the governed, the 8.4 grades of formal schooling attained by the average adult past twenty-five years of age in the United States is meagre preparation for the responsibilities of citizenship. Practically every major issue of current domestic and international affairs has arisen since the majority of adults left school. Yet the education of adults for citizenship has received only a fraction of the research attention which its importance requires. There is, however, a ferment abroad which is already promising a partial correction of this neglect.

Attitudes toward Public Affairs

Much investigation related to the education of adults for citizenship is topically marginal. That is, it is often one phase of a larger subject. Consider for example, the field of public opinion research. A great body of this effort deals with opinions about soaps, cigarettes, foods, automobiles, and other commodities of the market place. But the bearing of public opinion research on problems of adult citizenship is already impressive. The vast majority of those taking part in polls are adults. A comprehensive analysis of this field would leave little room for other topics of this review. However, some reference should be made to this burgeoning area of inquiry.

One formidable source of data on attitudes toward public affairs is produced by the four-times-a-year "Barometer of Public Attitudes" conducted by the Psychological Corporation under the supervision of Link (18). Data on the following questions presented in the latest report of this nationwide poll are ample proof of the relevance of this field for adult citizenship. What does Americanism mean to the American people? Are unions and the closed shop good Americanism? Should all races have equal job opportunities? Is private capitalism and the profit system good Americanism or bad? Now that the war is over, do you think we will make a peace settlement that will last, or do you think that we will have another world war in twenty-five years or so?

An even more prolific source of data in this area are the files of the *Public Opinion Quarterly* (12). In addition to research on public affairs, an important department of this periodical is the compilation, topically arranged, of poll results released by the American, British, Canadian, and French Institutes of Public Opinion, *Fortune Magazine*, National Opinion Research Center, the Danish, Finnish, Brazilian, Norwegian, and Swedish Gallup Polls, and the Netherlands Foundation for Statistics. This Journal

contains the most comprehensive record of public opinion research appearing in the period covered by this review. Data on adult attitudes toward some of the following topics are presented in the Spring 1947 number of the quarterly: atomic energy, civil rights, economics, industrial relations, housing, international relations, labor unions, pressure groups, politics, prices, strikes, and wages. Another source of information is *Opinion News*, a fortnightly digest of outstanding polls and surveys published by the National Opinion Research Center (22).

Blankenship (3) and Cantril (8) have brought out the two most important books in the field. McNemar (19) composed a critical review of opinion-attitude methodology, while Smith, Lasswell, and Casey (26) have brought up to date their well-known 1935 edition of *Propaganda and Promotional Activities* under a new title of *Propaganda, Communication and Public Opinion*. This is the most discriminating and comprehensive bibliography on public opinion now available, and as such is an important tool for research workers in the field.

Political Behavior

In an interesting quantitative study of political behavior for the period 1840-1940 Kerr (16) found a relationship between an increase of economic activities and an increase in conservative voting. In confirmation of the frustration-aggression hypothesis he discovered that hard times are followed by an increasing opposition to the conservative political bloc, and that increased suicides are usually followed by an increase in liberal votes. His article also contains a useful bibliography of nineteen items.

An extensive and frontier application of the technics of the public-opinion poll was reported by Lazarsfeld, Berelson, and Gaudet (17). The scope and cooperative character of the study foreshadows the type of research which the importance of adult citizenship requires. It examined how the voters of Erie County, Pennsylvania, made up their minds in the presidential campaign of 1940. By the use of repeated interviews of the same people it sought answers to the following questions: What is the effect of social status upon voting? How are people influenced by party conventions and the nominations? What role does formal propaganda play? How about the press and radio? What of the influence of family and friends? Why do people vote as they do? Construction of indexes of political predisposition, breadth of opinion, magazine and newspaper reading, radio listening, general exposure, political exposure bias, and agreement with arguments of either side was an important technical outcome of the investigation. Among other results they found that poor, uneducated voters show the lowest interest in the election and the more prosperous, educated ones the highest; also that older people have more interest in the election than younger, and that twice as many women failed to vote as men.

Studies of Participation

With some reason, a considerable body of writers contend that participation of adults in civic and educational activities is the essence of an alert citizenship. This view is clearly central to the idea of government "by the people" whether the government is legal or nonlegal. A penetrating discussion of the psychological component of participation has been set down by Allport (2). In a study of participation in cultural and educational activities in Springfield, Massachusetts, Kaplan (14) interviewed 5,000 men and women. He found that 33 percent participated in none of the activities studied, that only 39 percent had organizational affiliations, and that only 11 percent took part in forums. In all cases there was a high correlation between participation and socio-economic status. Bushee (7) found a much higher percentage (71 percent) of organizational affiliation in Boulder, Colorado. The role of the League of Women Voters as a pressure group for good government was studied by Brumbaugh (5).

Programs of Self-Study

One of the highest forms of civic behavior is the examination by the adult of the circumstances which condition the style and level of his living. If adults can lay hold of the basic facts surrounding their lives, they are better equipped to exercise the controls essential to self-management. Two superior examples of this type of effort have recently appeared. One, the result of four years of work, is a compilation of basic data on Georgia brought together by the Citizens Fact-Finding Movement of that state (9). The other is an occupational inventory of the number and kinds of jobs in Cuyahoga (Cleveland), Ohio (23). For purposes of this review the distinguishing feature of these two studies is that they are examples of competent research undertaken jointly by lay and professional adult leaders. They indicate that under proper technical supervision, the layman may be a productive research worker.

Programs of Community Self-Help

One proof of the quickening interest of adults in civic affairs is a growing nation-wide movement for community self-help. This movement takes many forms. In some places it is the layman's part of rural (land use) and urban planning. In other places it is the growing educational frontier of the council of social agencies. In most cases, it involves a large amount of community organization, so much so that from the viewpoint of the writer too many persons are too much occupied with structure of operation and too little concerned with functions and goals. Many years of experience at national, state, and local levels with governmental and non-governmental agencies leads the writer to propose community self-help as the general overall objective of these various efforts, while community organization is a means of community self-help and single or multiple community and citizens councils are forms of community organization.

In spite of its diffuse and amorphous character, the movement for community self-help is tangible and promising, but because of its diffuseness, complexity, and recency it still lacks adequate description and appraisal. Some interesting writing is appearing, however.

Working out of the Extension Division of the University of Virginia, the Ogdens (24) have brought together appraisals of thirty-four citizens' programs. They presented no quantitative measures, but the last three chapters of their book might form a guide for quantification in this field. The Committee for Kentucky (10) and the Georgia (13) and New York State Citizens Councils, 309 McBride Street, Syracuse, New York, are too recent to have produced important documents, yet the New York Citizens Council is cooperating with many of the colleges and universities in conducting an analysis of community satisfactions and leadership, and plans are underway for a similar use of research workers in both Kentucky and Georgia.

But wherever programs have established roots, more adequate reports of their achievement have emerged. For example, as participant observer, Reid (25) described an experiment in coordinating community, state, and federal agencies for the purpose of assisting the people of Taos County, New Mexico, to help themselves. His exposition of process is clear and nontechnical and such tangible outcomes as better roads, health agencies, schools, irrigation, and library services are reported. With neither the manner nor the documentation of a sober research publication, Alinsky (1) outlined the operations of a people's organization. Stressing the necessity of a global attack and the use of indigenous leadership he based his exposition largely on the experience of the Back of the Yards Council in Chicago.

In order to find out how the lives of people in a rural state and of their families and communities may be enriched, Brownell and Meadows (4, 20, 21) set up the Montana Study, a unique project in community research. At this stage most of the reports are tentative in character, but the project was one of the most inventive applications of the humanities and social sciences to community adult education ever attempted by a state.

The most penetrating account of community self-help now available is Brunner's (6) report of five years of experimentation in community organization and adult education in Greenville County, South Carolina. In his role as consultant observer the author analyzed the mistakes and achievements of the effort and detailed the stages thru which the processes of coordination and education advanced.

None of the preceding projects has employed quantitative measures of appraisal. This deficiency is being corrected by the Michigan Community Service Program in a thoroly planned effort to educate adults for community self-help. In mid-passage the Michigan program has produced only one modest publication (11), but some important reports should be ready for the next cycle of this number of the REVIEW.

Forecast

The movement for community self-help should be more productive of discriminating publications in the not distant future. A number of developments are under way to support this expectation. The Research Center for Group Dynamics at the Massachusetts Institute of Technology and the Commission on Community Interrelations of the American Jewish Congress are developing technics of action research applicable to this field. The University of North Carolina has added a division of interpretation to its program of social science research, and the University of Kentucky is launching a project of field studies aimed at community betterment. The Metropolitan Area Project and the recently established Survey Research Center and Bureau of Studies in Community Adult Education at the University of Michigan give promise of investigations related to the field of adult citizenship. In addition, the committee on community organization of the American Association for Adult Education, the interim committee on community leadership of the National Planning Association, the American Association for the Study of Community Organization, and the National Institute of Social Relations should soon bring their respective activities to some systematic formulation. The field is growing significantly.

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INTRODUCTION

THE RESEARCHES covered in this review reflect several trends in the studies of growth. Repeated tests and measurements of the same children continue to yield valuable information about what to expect in the course of development in the individual child. Norms for trends in growth are thus being set up, to supplement cross-sectional age-averages.

There is strong evidence for an increasingly felt need for more revealing tools with which to evaluate and predict. This is seen in an effort to tease out from the complex of factors, inherent and environmental, those which determine a particular child's slow or rapid progress (both physical and mental), his good or poor social adjustments, his pleasing or distorted personality, his physical vigor or inertia, his health, and his characteristic reactions to both detrimental and beneficial events.

On the environmental side the studies range from bio-chemical influences on the fetus, on the one hand, to social classes and cultural practices on the other. In the studies of inner drives and the evaluation of environmental impacts on them, there is an increasing use of projective technics, primarily the Rorschach, the Thematic Apperception Test, and various forms of doll play. Altho much has been published on these tests, they remain relatively crude and unstandardized, and they still depend largely on the guesses and clinical insights of the persons who use them.

As for the ages of the subjects studied, there is an extension of interest to the developmental changes which occur thruout the entire life span. The studies of emotional factors affecting development in early infancy are very provocative, but so far they may be classed as primarily exploratory, and needing more exact experimental control. Altho the developmental processes in the adult are slow, there are continuing changes in mental functionings, outlooks, attitudes, and physical conditions of the individual as he grows older. An understanding of these changes is important, not only for the general study of human development, but also for the evaluation of adult-child relationships, which are a part of the social environment in which the child is growing and to which he is reacting.

There is an increasing and very significant interest in interdisciplinary relationships. The extent to which the various growth processes and environmental factors are interrelated and influence each other has been the subject of a number of studies. It has been difficult to decide how to classify such researches. Altho the same research may be mentioned in more than one chapter, the general policy has been arbitrarily to restrict mention of a study to one chapter. Therefore, readers, looking for studies which extend across several areas, should consult all of the chapters which may be concerned.

NANCY BAYLEY, *Chairman*
Committee on Growth and Development

CHAPTER I

Intellectual Growth in Childhood

FLORENCE L. GOODENOUGH and DALE B. HARRIS

Introduction

THE three years which have elapsed since the publication of the previous review of this topic by Worcester (69) have been characterized by continuation of previous lines of interest rather than by extensive embarkation into unexplored channels. Perhaps the most noticeable shift in emphasis is to be seen in the increasing use of projective methods and particularly of drawing and painting as a means of exploring the more subtle aspects of the child's inner world of thoughts and feelings and the changes in his mental structure that come with growth and experience. Altho it is primarily concerned with the use of drawing and painting in the clinical study of children, the two-volume report by Alschuler and Hattwick (2) includes many significant observations on the mental changes that occur during the preschool years, while the somewhat more impressionistic work of Werner Wolff (68) provides further suggestions as to the possibilities of this line of approach to the study of the less readily accessible areas of the child's mind.

The triennium has also been marked by a renewal of interest in the nature-nurture controversy, chiefly on the part of the environmentalists, and by a number of important studies on the predictive value of tests over considerable periods of time. Other topics on which considerable research activity has been expended include the field of racial and sex differences, educational retardation, particularly in respect to reading, the growth of conceptual thinking, and the mental growth of children suffering from various physical handicaps, including cerebral palsy. Several important new tests have been brought out and the reliability and validity of some of the earlier tests have been subjected to renewed scrutiny.

General Texts and Reviews

The *Manual of Child Psychology* prepared under the editorship of Leonard Carmichael (9) is by far the most comprehensive review of all the major research findings in the field of child development that has appeared since the publication of the two earlier editions (*Handbook of Child Psychology*, First Edition, 1931, Second Edition, 1933) edited by Carl Murchison. The nineteen chapters, each by a specialist in the field covered, are well documented with bibliographies running up to several hundred titles on a single topic. This makes the book an invaluable reference source for all who are working in the field. Chapter 9 entitled, "The Measurement of Mental Growth in Childhood," by Florence L. Goodenough and Chapter 11 "Environmental Influences on Mental De-

velopment" by Harold E. Jones are most closely related to the present discussion but most of the others include some material pertinent to this field.

Gertrude Hildreth (25) has published a supplement to her *Bibliography of Mental Tests and Rating Scales*, which covers the material published since the date of the original list (1939) thru 1945. Thurstone (54), in a brief but cogent discussion of the different theories of the nature of intelligence and their relationship to the methods of deriving scales for appraising the mental level of children, has given some account of the derivation of his recently published scale of primary abilities for ages five and six.

New Tests

Among the new tests for use with young children, this extension of their work on the measurement of primary mental abilities by Thelma G. and L. L. Thurstone (55) should be given first rank. Five primary abilities—verbal meaning, perceptual speed, quantitative, motor, and space—have been isolated. Mental age norms for each of these abilities separately and for the total are available, from which quotients may be obtained by the usual method. All the tests are pictorial and no knowledge of reading or writing is required. No data on self-correlation of the various scales or on the stability of the results over a period of time have been presented as yet. Valentine (58) has devised a new intelligence test of the year-scale type for use with children between the ages of eighteen months and eleven years. Some of the items are taken from the work of Gesell, Terman, and others while the remainder are original with the author. This test was tried out by Wakelam (59) with 251 kindergarten and primary grade children in the Birmingham schools. The correlation with teachers' judgments of ability was found to be $+.60$; with measurements of later educational achievement the correlation was $+.81$. For a group of forty children who were very backward in reading, the extent of improvement under remedial instruction was predicted by the test to an extent indicated by an r of $+.49$. The stencil design test recently developed by Grace Arthur (5), while intended primarily for use with older children, is also adapted to the upper ranges of the preadolescent age group. The test is a highly original one and is said to provide a particularly valuable situation for the clinical observation of children in addition to the quantitative scores. The preschool form of Wilson's Symbols Scale seems to have promise as a reading readiness test (66). Drummond and Gilliland (15) have given a brief report on the methods they are using for the validation of the Gilliland-Shotwell Infant Intelligence Scale, which is still in process of development.

Mental Development in Infancy

The Embryology of Behavior by Gesell and Amatruda (17) is an exceptionally thought-provoking account of the fetal and neonatal behavior

of the human infant presented against a background of racial history on the one hand and the hope of individual and racial progress on the other. Two articles by Morgan and Morgan (42), (43) suggest that the rate of acquisition of certain adaptive behaviors such as following a moving object with the eyes, response to playful approach by the examiner, etc., not only provide valuable information as to the developmental level of an infant at the time but may also be predictive of his future potentialities. Irwin and Chen (30) correlated the speech sounds of ninety-one infants under the age of two years, classified on the basis of type (number of different sounds) and token (total number of sounds made during a specified time) with their mental ages on the Kuhlmann-Binet Scale. None of the obtained correlations was high enough to be reliable. This suggests that the development of speech sounds during the first two years of life is relatively independent of mental test performance.

Mental Tests and Prediction

Of particular significance is Bradway's recent study (6) based on a follow-up of 138 of the 213 children between the ages of two and five-and-a-half years who were tested in the course of the original standardization of the 1937 Revision of the Stanford-Binet Scale and retested with Form L of the scale ten years after the original testing. Every attempt was made to locate and retest as many of the original group as possible and the analysis of the results is very complete. On the basis of manifest content, the scale items were divided into four sub-scales: (a) verbal, (b) nonverbal, (c) memory, (d) number. Both the separate items and the differential scales for verbal and memory abilities at the preschool level predicted later standing better than did the other two scales. For the total scale the correlation between initial Form L and final Form L was $+.58$; between initial Form M and final Form L, $+.67$, and between initial composite (L + M) and final Form L it was $+.66$. Little correlation was found between the usefulness of an item in predicting total score at the time of testing and its value for long time prediction—a fact which casts considerable doubt on the validity of this highly popular method of item-analysis.

Hirt (26) reported retest findings on the 1916 Revision of the Stanford-Binet for 1357 children, with a wide range of ages and intervals between testings, who had been referred to a child guidance clinic. Forty-six percent changed less than five IQ points; three and a half percent changed twenty points or more. Allen (1) compared the standing of 327 fourth-grade children on the Kuhlmann-Anderson Group Intelligence Test with their performance on the same test when they were in the first grade. She found that results expressed in terms of IQ were somewhat more stable ($r = +.69$) than when they were stated in terms of the *Percent of Average* recommended by the authors of the test ($r = +.65$).

Factors Associated with IQ Changes in Childhood

In four studies from the University of Iowa Child Welfare Research Station the earlier statements of that group with respect to the effect of nursery-school training and foster home placement upon the IQ's of children are reasserted. Wellman (61) analyzed the results of some fifty studies reported in the literature and found a general tendency for IQ's to increase after a period of attendance at nursery school which was slightly greater than that found for non-nursery school children. In an attempt to account for the alleged effect of nursery-school attendance, an analysis of teacher-child contacts was made by Wellman and McCandless (62) using a time-sampling technic with carefully defined categories. A first study based upon sixty-six cases showed no relationship for the group as a whole between the number or type of teacher-child contacts and either changes in IQ or in vocabulary as measured by the Smith-Williams Scale, but an r of $+.475$ was obtained between teacher-contacts and change in vocabulary for eighteen children who were new to preschool. Similar results were obtained in a second study of thirty-four cases in which the vocabulary score was considered in relation to mental age. Again the relationship between teacher-child contacts and vocabulary change was positive only for the new entrants. A study by Wellman and Pegram (63), in which the original data from the orphanage study reported in 1938 by Skeels, Updegraff, Wellman, and Williams were reanalyzed by somewhat different methods from those originally employed, has been criticized by McNemar (38) on technical grounds. It might also be noted that from the facts here presented for the first time it can be determined that the distribution of ages at initial and final testing was very different for the preschool and the nonpreschool groups. It appears that equalization of the age factor would cause most of the reported differences between the groups to disappear. Skodak and Skeels (51) made a very complete analysis of the results of a further testing at the average age of seven years, 0.7 months of 139 of the adopted children in the group which they have been following. The mean IQ at this time was 113.1. The correlation between the IQ's of the children (all of whom were placed in their adoptive homes before the age of six months) and the education of their true mothers continued to exceed that between child IQ and foster-mother education but, as the authors correctly point out, this does not explain the high mental level of these children.

McHugh (36) reported a mean IQ increase of 7.4 points on the Good-enough Draw-a-Man Test for eighty-three children after two months attendance at kindergarten. The precaution of delaying the administration of the test until after at least a month of kindergarten attendance recommended by the author on page fifty-six of the manual of instructions was evidently not followed. Tomlinson (57) found that when the older member of seventy-five pairs of Negro siblings in the age range of four to nine years was compared to the younger member with respect

to IQ on the 1937 Stanford-Binet, a significant difference in favor of the younger siblings was established. Further research is needed to determine whether this difference is innate, environmental, or due to the nature of testing instrument.

Two studies on factors related to large changes in IQ yielded very different conclusions. The first is a statistical investigation by Bradway (7) of the fifty cases with largest IQ changes taken from the study mentioned in an earlier paragraph (6). The data are entirely quantitative and a large number of possible causes both in the hereditary background and in the cultural and emotional conditions under which the children were reared were investigated. Altho most of the factors studied showed some relationship to IQ change, factors such as parental IQ, grandfathers' occupational status, and others which Bradway regarded as determined chiefly by "inheritance" showed a far higher correlation to IQ change than did such "environmental" factors as the Minnesota Home Index, happiness in the home, material surroundings, and the like. In a much more impressionistic type of study, Despert and Pierce (14) found that of twenty-two nursery-school children whose IQ's changed ten points or more on retests, the direction of change appeared to be related to concomitant changes in the children's emotional adjustments. Harris and Thompson (20), however, have pointed out that such changes as occurred can be explained on purely statistical grounds.

Cooley (11) found little difference between dull and bright children with respect to their amenability to child guidance. Yager (71) found that under experimentally induced emotional tension, intelligence test scores were more likely to increase than to decrease.

Critical Studies of Tests and Testing Procedures

Studies of the reliability of the Goodenough Draw-a-Man Test have been made by McCarthy (34) and by McHugh (36). The latter has also reported biserial correlations between items on the Draw-a-Man Test and 1937 Binet IQ's (37). Ames (3) reported that the presentation of an incomplete model on which children were to supply the missing features facilitated drawing in the case of young children but interfered with it after the age of approximately five years. Patterson (45) found that mentally defective boys under the age of ten years gained more from practice on the Arthur Performance Scale than those over ten. Wallin (60) compared the correlations of the 1916 and the 1937 Revisions of the Stanford-Binet with those from the Arthur Scale and found that the 1937 revision usually yielded lower IQ's than the Arthur Scale and that the correlation between the two was only $+.53$ as compared to $+.72$ for the 1916 Revision. It should be noted, however, that different subjects were used in the two comparisons. Hutt (29) failed to secure any evidence that a modified order of presentation of test items, planned to be more "acceptable" to the subjects, yielded higher results than those obtained

by the standard order. Tilton (56) found that backward children "scatter" more than average or bright ones on various standard tests. Mayman (41) published a review of sixty-one studies on this topic, the greater number of which were based on the Stanford-Binet. Spaulding (52) found little consistent tendency towards change in IQ when complete Stanford-Binet test blanks were rescored on the basis of the abbreviated scale. Wright and Magaret (70) found higher first factor loadings for those items of the 1937 Stanford-Binet that are more difficult for mentally defective children than for normal subjects of corresponding mental age. Criticism of the Kuhlmann-Anderson group tests by Wimberly (67) seems to have been adequately disposed of in a reply by Anderson (4) who admitted, however, to some lack of clarity in the original account of the method of standardizing the test. In an important monograph, Maurer (40) has shown that when intellectual status at maturity is used as a criterion for item validity, the choice of items for use in scales intended for children of preschool age is likely to differ considerably from that made on the basis of immediate indications at the time of testing. This is quite in accordance with the report by Bradway (6) previously mentioned. Kent (32) has established tentative additional norms for the younger ages on her Emergency Battery, and Sanderson (48) has provided figures for the fifth, eighth, and eleventh school grades on the Porteus Qualitative Maze Test.

Racial and Sex Differences

Perhaps the most intensive and extensive study of sex differences in mental traits that has ever been made has recently been completed in Sweden by Siegvall (50). Only the brief mention of this study in the *Psychological Abstracts* has been available to the present writers but the importance of the study seems to justify its mention. Lewis (33) discovered an excess of girls over boys in the upper two percent of the distribution in a study of the results on the Kuhlmann-Anderson Test from approximately 45,000 subjects in grades four to eight from thirty-six states. This is contrary to the usual findings and may be due to the large verbal content of the test used. Chapanis and Williams (10) reported a similar excess of girls in the upper brackets on this test for both white and Negro children in Tennessee. Negroes of both sexes fell below the performance of the whites. Brown (8) ascribed the low standing on the Stanford-Binet of Negro kindergarten children in Minneapolis to environmental constriction. Both Darcy (12) and Demarest (13) found bilingual children inferior to monolinguals on the Stanford-Binet. Havighurst and his associates (21), (22) gave a number of performance tests to children in several Western Indian tribes. The results varied considerably from one tribe to another. The Hopi group had an average IQ of 110 while the Papagos were below the average for the whites. There was no evidence that amount of white blood was a factor in test performance. On the

Draw-a-Man Test the Indians generally surpassed the standards for white children.

Physical Handicaps in Relation to Mental Development

Children handicapped by cerebral birth palsy have been subjects of a number of investigations during the triennium. The difficulties encountered in arriving at a dependable appraisal of the intelligence of these cases has been pointed out by Strother (53) and by Maurer (39). The latter has described a modified form of the Stanford-Binet for use with spastic children. She obtained an average IQ of seventy-nine for eighty-five diagnosed cases and a test-retest correlation of $+ .90$. Sarason and Sarason (49) attempted to use the difference between performance on the Kohs Block Design Test and that on the Stanford-Binet as a means of discriminating between mentally defective children with and without cerebral birth palsy. A Kohs performance scoring eighteen mental months or more below the mental age attained on the Binet appeared fairly diagnostic of brain damage while the reverse tendency seemed characteristic of children whose defect was of the familiar type. Werner (64) found evidence that nonbrain-injured mentally defective children show a kind of "global" or undifferentiated perseverational tendency in the test situation while those suffering from brain injury display a less generalized, unpredictable form which Werner designates as "disintegrated."

The Development of Logical Thinking in Childhood

McHugh (35) found no basis for Moore's contention that autistic thinking, defined as the tendency to draw conclusions on the basis of a false premise, is a special and transitory phenomenon of childhood. Its course of development is merely the converse of that of logical thinking and is a function of the difficulty of the task rather than of age as such. In like manner, Huang, Yang, and Yao (28) found that "phenomenistic" explanations by children are dependent upon the apparent similarity between antecedents and consequent when the true nature of the causal relationship is unknown. Huang and Lee (27) found that young children were more strict in granting the status of *having life* than of *living* to a variety of animate and inanimate objects. Language differences make desirable the repetition of such a study in this country. Werner (65) is of the opinion that much of the discrepancy in the reports of various investigators of the nature and significance of "mental rigidity" can be traced to differences in their definitions of the term. Piret (46) found that much valuable information can be had by asking children to give their reasons for replying as they did to those items on intelligence tests which require the drawing of conclusions or other acts of logical judgment. Mott (44) reported that by having children go thru a series of specified movements of different parts of their bodies, together with verbal descriptions of these movements ("This is my head. I nod it"), the number of parts shown in

their drawings of the human figure will be increased. She concluded that concept formation is facilitated by muscular action.

Mental Development in Relation to Learning

Gill and Gill (18) found correlations in the neighborhood of $\pm .85$ for various elementary-school classes between scores on the Kuhlmann-Anderson Tests and Gates Silent Reading Tests. In a carefully conducted study by Jackson and Phillips (31) the IQ was found to be more symmetrically distributed and hence was judged to be a better indicator of first-grade reading success than the MA. Herr (23) reported a beneficial effect of prefirst-grade training upon both reading readiness scores and those earned on the Pintner-Cunningham Primary Intelligence Test for five-year-old Spanish-American children. Factors associated with reading difficulty have been studied and discussed by Hildreth (24) and by Robinson (47) while methods of overcoming reading handicaps have been outlined by Farson (16) and by Gillingham and Stillman (19).

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CHAPTER II

Mental Development during the Preadolescent and Adolescent Periods

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MOST of the recent studies of mental development in later childhood may be characterized as exploratory, with indications that more extensive and analytical research may be expected. Some specific factors investigated are at times difficult to relate to the general pattern of development. As significant as many of these specific factors are, their importance to the growing child is often confused by complexities within the child himself and within the technics by means of which he is studied.

Methodology

One difficulty in tracing mental development is the changing nature of the individual being studied, making inappropriate the materials and technics used at an earlier age. Gesell, *et al.* (18) found it necessary to modify their procedures from age to age to meet the shifting contexts and accents of development. Their developmental reference points are not "norms" in the sense of successive steps on a scale, but as stages thru which development progresses. These stages, called "growth gradients," they warn, will be of aid to child guidance only if they are used in relation to the total growth "complex."

A similar methodological approach to the study of development has been proposed by Olson. By following growth in a number of characteristics, Olson and Hughes (39) state, a better understanding of development is secured than by studying a single attribute. Various attributes tend to cluster around a "center of gravity of growth" of that individual. Jones (26), using longitudinal data on children ten to eighteen years, traces the development of one boy as compared with the norms set up for the group. The pattern of the boy's progress is traced for intellectual, physical, and various social and personality factors.

Technics

The development of technics during the period covered by this report has been characterized more by their breadth of content than by the precision and control of nonexperimental variables. Considerable attention has been given to projective technics, and the aspects of behavior with which the results may be associated. In these studies there seems to be less statistical validation of methods and results than is ordinarily expected in research reports. Whether this will be an advantage or a disadvantage future progress will have to decide.

Schmidl (47), reviewing the literature on the use of the Rorschach test

in relation to delinquency, points out that students of this technic have not arrived at any definite criteria for detecting delinquents. It may be necessary, he concludes, to quantify some of the factors of this technic which up to now have been considered qualitative.

The Thematic Apperception Test has been applied in a variety of studies. In studying the case of an adolescent problem boy Rosenzweig and Isham (43) compared Thematic Apperception Test results of the boy with that for his mother. The authors point out the value of the technic in demonstrating complementary psychodynamics of such problems.

Until recently the Porteus Maze Test has been used chiefly as a measure of the kind of intelligence correlating with the Binet scales. Porteus (40), however, has proposed a "qualitative score" derived from the way in which the mazes are marked. These qualitative scores were used by Sanderson (45) with children in Grades V to XI. She found a definite relationship of these scores to age and grade in school altho the correlation with the quantitative maze scores and Binet scores was reported to be low. A greater difference was found between those in Grades V and VIII than between those in Grades VIII and XI.

The relative influence of group testing and individual testing technics was studied by Bennett (2). The Terman Group Test of Mental Ability was administered individually to one group, and was given to a matched sample as a group test. She found no evidence that "social facilitation" or its opposite influenced the scores. Goldfarb (19) compared two standard intelligence tests, the Stanford-Binet form L, and the Wechsler-Bellevue, on a group of adolescents. They scored higher on the Stanford-Binet. Sartain (46) also found that college students score higher on the New Revised Stanford-Binet than on either the Bellevue or the Otis Self-Administering test. Roth, *et al.* (44) describe a testing program in which 95.5 percent of the child population in a county were tested or appraised for their intelligence.

Longitudinal Studies and Relationships with Later Development

Pointing out that little research was found on the constancy of the IQ during adolescence Knezevich (29) studied changes in Henmon-Nelson scores from the high-school sophomore to the senior years. He found considerable shift in position within the group ($r = .70$) with a mean increase of two IQ points. It appeared that mental growth of this group slowed down but did not stop at sixteen years. It should be pointed out that this study did not include a comparison of changes in intelligence test scores for students in different environments as has been characteristic of similar studies at the younger ages.

Gesell, *et al.* (18) have reported research findings on children to ten years of age. This report is a longitudinal study in a biographical or clinical sense, but does not propose to be confirmed to seriatim data taken at regular intervals with the same measures. Ten years after a group of

preschool children had been examined with the Revised Stanford-Binet scale the same children were reexamined by Bradway (5, 6). As noted in Chapter I, several factors in the environments of those who had shown the most significant changes were studied. Muench (37) located and retested a group of boys living in the city of (Columbus, Ohio) who had been diagnosed as mental defectives in the Opportunity School eighteen years previously. On the Stanford-Binet, Porteus Maze, and Army Alpha he found a statistically significant increase. On a literacy test the increase was not significant, and on the reading test there was little or no change.

A few studies have been reported in which adolescent behavior was related to adjustment in the Armed Forces. Gardner and Goldman (17) compared the childhood and adolescent histories of five hundred sailors confined to disciplinary barracks with that for sailors who had not been subjected to disciplinary action in the Navy. Eight factors were isolated as being predictive: (a) broken home, (b) truancy, (c) expelled from school, (d) retarded three or more years in school, (e) persistent enuresis, (f) running away from home, (g) civilian arrests, and (h) atypical sexuality.

Lagrone (32) found that patterns of delinquent behavior tended to appear at an early age among recidivists in military service. He found, however, that a broken home did not distinguish between recidivists and nonrecidivists. This is not necessarily in disagreement with the results of Gardner and Goldman since they compared disciplinary cases with non-disciplinary cases.

Marmor and Zander (35) found that a significantly large proportion of Maritime Service enlistees were immature, low in ability, and were from poor or unhappy homes. Those sixteen-year-olds were consistently poorer in scholastic success and home conditions than seventeen-year-olds. The influences of Selective Service policies on these factors were pointed out.

Language

A study of the language of adolescents was included as part of the California Adolescent Growth Study. Changes in speech were measured over a four-year period by means of records of spontaneous verbalizations in a "free" social situation. Jones (27) reported that adolescent language was typically colorful, centered largely in personal and interpersonal relationships. Over the four year period it became slightly more careful, less colorful, and was centered in world affairs and in interests of an academic or vocational sort.

A study of the kind of language used by school children in Grades IV to XII was made by Chotlos (12) who secured 3000 written language samples from 108 school children selected at random from a large population. Older children and those with higher IQ used more highly differentiated language structure, more nouns and adjectives. Younger children and those with lower IQ used more verbs. Carlton and Carlton (9) found

that mentally defective adolescents made more errors and different kinds of errors in oral language than did a "normal" group of the same mental age, sex, and parental socio-economic status. Reiss (42) studied the kind of words (homophone, antonym, synonym) to which children of different ages could most easily be conditioned.

One of the difficulties in studying language development in relation to other measures of mental growth has been the lack of crucial, comprehensive language measures. Johnson (24) has proposed quantitative measures of language behavior which appear to meet some of these requirements and permit more adequate statistical analysis.

Mental Development in Relation to Cultural and Racial Characteristics

Several studies have been reported in which mental development has been related to rather broad cultural patterns. Most of those related to personality and social behavior have been summarized in chapters IV and V.

A study of the impact of the English culture on orientals living in Hawaii was made by Kuhlen (30). The Pressey Interest-Attitude Test was given to 1589 Japanese and 690 Chinese, the results of which were compared with those for white children of comparable age and grade. He concluded that cultural influences on taboos and moral wrongs (which are sufficiently crystallized to be taught as such) were made rather early. Chinese who had been in Hawaii longer were more similar to the white children.

Demarest (14) studied the differences on five standard tests administered to Anglo-American and Spanish-American Grade VII boys. There were marked differences in results on the Stanford-Binet and the vocabulary test. The Wechsler-Bellevue test gave the most comparable results for the two groups.

The effects on the child's development of changes in cultural influences were studied by Ojemann (38). Units were incorporated in Grade IX science classes which were designed to develop an analytical approach to human behavior. An hypothesis underlying the program was that one important factor in determining the growth of a person's behavior toward another is the insight he has into the factors which underlie and determine human behavior. The results of tests show that the ideas presented were not too abstract or beyond the pupils' learning ability.

Pratt (41), studying the fears of rural children four years to approximately sixteen years of age, concluded that girls have more fears than boys. The evidence indicated that the number of fears increased with age. Some fears appeared to have a cultural rather than an individual and specific origin. On the other hand, Kuhlen and Arnold (31) comparing twelve year old children with those eighteen years old found no evidence that "problems" of a religious nature increased with age. Significant differences in religious beliefs were found, however, between the two age groups.

Social Adjustment in Relation to Mental Development

Studies of several technics have been reported for identifying delinquent children and for predicting their adjustment. Bijou and McCandless (4) studied predelinquent, mentally retarded boys (mean Binet IQ of 69). They found that children with certain patterns on psychometric tests made better institutional and post-institutional adjustment than those with different patterns of test performance. Those with highest "behavior efficiency" (disparity between score on performance test and score on verbal test) had made better adjustment six and one-half years after leaving the institution (3).

Using the Woodworth-Mathews Psychoneurotic Inventory, Harris (22) found that this questionnaire did not predict much better than chance the stability, or "emotional adjustment," of delinquent boys in a correctional school. A means of scoring the Porteus Maze Test has been proposed by Porteus (40) which in his study clearly distinguished delinquents from nondelinquents. Ash (1) found that there was a marked discrepancy between scholastic ability of delinquent adolescent boys and their actual school achievement.

Studying the electro-encephalogram (EEG) of children with behavior problems, Michaels and Secunda (36) found that those in the thirteen-to eighteen-year age group exhibited a higher incidence of EEG abnormality than children in a younger age group. Neurotic traits, with the exception of a history of enuresis, did not appear to be associated with EEG abnormality.

Some relationships of intelligence to delinquent behavior were studied by Stadford (49). Socio-economic and cultural factors appeared more important than intelligence in determining the type of problems presented by Negro children at the Institute of Juvenile Research.

The question of fluctuations in adolescent friendships was studied by Thompson and Horrocks (23, 51). The results of these studies do not confirm the theory that adolescents' behavior is extremely erratic and unstable, since adolescents demonstrated the same degree of stability in their friendships as did the preadolescents.

Personality Adjustment in Relation to Mental Development

Research published on personality adjustment has been varied both in content and method of investigation. Some studies not included in Chapter V are mentioned here. Scores on the Minnesota Multiphasic Personality Inventory were found by Capwell (8) to distinguish between delinquent girls twelve to eighteen years old and a comparable group of nondelinquent girls. In another study she reported that changes in IQ do not seem to be associated with personality adjustment (7). The Rorschach technic was used by Goldfarb (20) to study the influence of early environment on the character and extent of mental development. Adolescents in foster homes who had spent three years in institutions very early in life showed

more undesirable personality traits than did a comparable group (age and sex) who entered similar homes without such institutional experience.

Gruen (21) found that "adjusted children" twelve to fourteen years of age as measured by the Rogers Test of Personality Adjustment kept estimates of their ability slightly above their performance level. "Mal-adjusted" children kept their estimates below their performance level or made gross over-estimates. Worbois (53) found that children who had participated in an intensive guidance program exhibited better emotional adjustment as measured by the Luria technic than did a group of control children.

Investigating the question of whether adolescent and postadolescent children have more unpleasant experiences and fewer pleasant experiences, Thompson and Kepler (52) asked students in the Grades VI, IX, and XII to list as many of both kinds of experiences as possible. Preadolescents gave more pleasant items and fewer unpleasant items than did adolescents and postadolescents. The authors point out that the adolescent's life expands to include sex, social, vocational, and other interests some problems of which may be difficult to resolve.

Learning

One correlate of learning ability commonly used is school achievement. The relative achievement of dull and bright children was compared with their expected achievement as predicted from their mental age by Lewis (33). He found that bright children were retarded and that dull children were advanced in comparison with expectation. As was pointed out, however, chronological age should be held constant since the dull children have spent more time in school.

Conditioning of four different age groups (seven years to eighteen years, six months of age) to give an electro-dermal response to various kinds of words was studied by Reiss (42). Of the three types (homophone, antonym, and synonym) the youngest group showed the greatest transfer to homophones and least to synonyms. The results were the reverse for older children. Shaw and Kline (48) found that "muscle action-potentials" increased with the difficulty of the problem and was higher for those of lower intelligence. Klugman (28) used as a memory problem the copying of a dot from one sheet to another in the same location on the page.

Sex Differences

Sex differences in mental measures are not uncommon for children during the adolescent period. The significance of these differences are often obscure, however. Standard intelligence tests deliberately minimize the differences by including items which do not contain sex discrimination. When sex differences are found on such tests there is a question whether to interpret the results as differential rates of development or as factors which were not controlled in the construction of the test.

Lewis (34) compared the proportion of boys and girls in the upper ten percent of 45,000 children in Grades IV to VIII from thirty-six states. Since 2676 girls and 1853 boys were included, he states that there is no longer any justification for stating that more superior boys and girls are to be expected. Chapanis and Williams (11) found that girls in a Tennessee county were superior to boys on the Kuhlmann-Anderson test scores. Terman, *et al.* (50) discuss and evaluate the research on "Psychological Sex Differences."

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CHAPTER III

Intellectual Changes during Maturity and Old Age

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As suggested in the last review of this topic in 1944, a large proportion of the published articles on intellectual changes during maturity and old age refer to the use of tests of intelligence, memory, and other functions in psychosis. For the current review, therefore, articles involving intellectual changes in clinical cases are not cited unless they also make a contribution to the understanding of normal aging processes. In general, the trend during the last three years has been toward the development of so-called short form, emergency, or rapid methods of appraising intelligence. While such rapid methods may have value in the speedy classification of personnel, the resulting tests tend necessarily to become less reliable, less valid, and less global. A consequence of the rapid testing, therefore, is a restriction in the amount of material available for a description, if not an explanation, of the intellectual changes in the aging process.

The Wechsler-Bellevue test continues to be the most widely used intelligence scale for adults despite occasional criticisms of its standardization or of its measurement of deterioration. The criticism of the naive interpretation of *intelligence test scores* is being continued with a few studies pointing up the influence of experiences, training, schooling, and remedial reading on such scores.

Reviews of the Literature

Brody (7) has brought up-to-date his review of the literature on the use of tests for the study of psychoses and allied disorders. His summary considers the relation of premorbid intelligence to intelligence in mental illness, the measurement of so-called deterioration, the diagnosis of psychopathology thru test results, and the relationship of therapy to changes in test scores. Another excellent treatment of the same topic was made by Jones and Kaplan in the essay "Psychological Aspect of Mental Disorders in Later Life," in the book by Kaplan (24). An intensive critical appraisal of the studies on the quantitative and qualitative sequelae of organic brain lesions and ablations was made by Klebanoff (27) who gives a bibliography of 138 references. A fairly complete résumé of the results from the use of the Wechsler-Bellevue was made by Rabin (45). This summary was supplemented and somewhat amplified by Watson (56).

The Subcommittee of Social Adjustment in Old Age has prepared a research planning report (49) which includes a classified and annotated bibliography of 429 titles. Lorge (49: 125-32) reviews theories and pre-

vious research about intelligence in old age, and suggests needed research in the area. Among the theoretical research suggestions is the notion of constructing an adult intelligence test based on the experiences of adults, and the clarification of the concept of mental deterioration. Rosenthal (49) has appended a bibliography in twelve sections.

Robert Ellis (11) surveyed the literature on relative variability of mental traits. One section of the survey deals with age differences suggesting a confusion due to inadequacy of measurement and the mixture of speed and power in appraisal of some mental functions.

Test of Adult Intelligence

The third revision of Wechsler's book (57) is basically like the earlier editions. New material is added about test patterns in clinical evaluation and for estimating mental deterioration. Some criticism about tests that "hold up with age" was made by Rabin (42). He gave the Wechsler-Bellevue to 100 hospital patients including psychotics. The results suggest that separation of tests as those which *do* or *do not* hold up with age is not substantiated. In another study (44) of 60 patients on test-retest with the Wechsler-Bellevue, the retest correlations for separate subtests ranged from .44 to .99, the lowest was for comprehension and the highest for information. In general, over an average period of about thirteen months, significant gains are made in arithmetic, block designs and digit-symbol.

The Shipley-Hartford Retreat Scale is currently used as a quick measure of intelligence and of mental deterioration. For deterioration, the conceptual quotient is used. The CQ represents the ratio of ability on abstractions and so-called basic ability in terms of vocabulary. Wright (59) shows the correlation between Wechsler-Bellevue and total Shipley as .77 and between the Verbal Scale of the Bellevue and the vocabulary of Shipley as .64. The deterioration, however, is greater on the abstraction test. Lewinski (31) shows correlations between Bellevue IQ's and Shipley vocabulary of .58, and Shipley abstraction of .61. Bradford (6) criticized the norming of the vocabulary section for British use. He rescaled the test and reduced the items to twenty. The new list correlates .95 with Shipley's original forty. Using the Shipley-Hartford with military prisoners, it was found (34) that more than half of the disciplinary cases had CQ's indicative of impairment. Assuming the vocabulary to be poorly standardized, the Army General Classification Test was substituted for the vocabulary. The result was that the CQ's now corresponded to the original norms. Garfield (16) points out that the mental age via Shipley-Hartford is lower than that via the total Wechsler-Bellevue.

Berdie (4) indicated that the Goodenough Draw-a-Man Test would be a valid indicator of adult intelligence at the lower levels of ability. Verville and Cameron (53) show identifiable age differences in perception of incomplete pictures suggesting that the ability to break *set* may be a factor.

Short Forms of Intelligence Test

On the basis of intercorrelations of Wechsler-Bellevue subtests with total scale, several short forms have been proposed. Geil (17) suggests Comprehension, Similarities, Digits, and Block Design which correlates .97 with full scale; Springer (50) shows a correlation of .96 for Comprehension Arithmetic and Absurdities; Arithmetic and Comprehension (10) correlated .93 with total verbal; Gurvitz (21) shows a correlation of .90 with Digit Span plus Picture Arrangement; and Patterson (38) reports five different short forms.

The Kent Emergency Test (E-G-Y) correlated .74 with the Wechsler Mental Ability Scale (21). Lewinski (30) reports a shortened form of the Kent Oral Emergency Test which correlates .81 with the longer form. Rautman (47) indicates that the Kent test gives IQ's ten points higher than the Revised Stanford-Binet, even tho the two tests correlate .84. The Kent test has been demonstrated to be invaluable as a quick appraisal. Additional norms are provided by the author (26).

Lewinski (29) found a correlation of .64 between the Bellevue-Wechsler and Scale B of the Herring Revision of the Binet and concludes that the latter is a poor test to use on illiterates, and is of no advantage as compared with the briefer Scale A. Pennington (39) rejects the Serial Sevens Test (subtracting 7 from 100 serially) as invalid when the criterion is the Wechsler-Bellevue. The shortest of short forms proposed is the PTI (25) which is composed of four vocabulary items, two comprehension items, three similarity-difference items and three arithmetic items. The PTI is reported as correlating .74 with Wechsler-Bellevue.

Deterioration

The general method of measuring deterioration as the difference between the intellectual level as measured by vocabulary and intellectual level as measured by other tests continues to be used and criticized. Acklesberg (1) points out that vocabulary appraisal by Capp's tests of synonyms, antonyms, categorization, word naming, and homographs shows differences between seriously and little deteriorated senile dementia cases. Rabin (46) reports that vocabulary scores rise from late "teens" to the seventies on the Babcock which may be one factor forcing increased deterioration with increasing age. Estes (12) suggests that a correction should be applied if a subject's verbal IQ deviates from the population average.

Wechsler's deterioration formula is criticized as failing to distinguish between mental deficiency and mental deterioration (5). Johnson (23) showed a correlation between the Deterioration Index (the ratio of tests that do not hold up with age to those that do) and chronological age of .60 for epileptics with IQ's of 80 and above; of .46 for epileptics below 80 IQ; and of .22 for nonepileptic feeble-minded.

Altus (3) reports a correlation of .88 between the Terman vocabulary test and the Army General Classification Test. He also notes high relation-

ship to the Wechsler Mental Ability Scale. Rabin (43) shows a correlation of .78 between the 1937 Terman vocabulary and Wechsler-Bellevue IQ's. The vocabulary gives higher mental ages than does the Bellevue.

The significance of the measures of deterioration was reviewed by Mayman (35) and studied by a short form Babcock (48) as distinguishing among various psychiatric classifications and normals.

Factors Related to Test Scores

Wall (54, 55) used Ballard's Reading Comprehension test in England with a group of 330 British soldiers engaged in general laboring duties. He found that low reading scores, while related in part to low level of intelligence, were also related to factors of curtailed schooling, absenteeism from school, and changes in schools. Lorge (33) showed that individuals, equated for intelligence score at or near age fourteen, who complete successfully more years of school make higher intelligence test scores at or near age thirty-four. Broxson (8) indicates that adults with intensive remedial instruction can improve significantly on rate and comprehension. Muench (36) followed up eighteen mental defectives after 18 years. He found an average increase of three years and six months on mental age for eight boys who had the 1916 revision. The author believes that the stimulation of community life may account for increase in scores.

Memory

Several new memory tests have been suggested. In one, (16) the scale is made up of counting up to a number and spelling with interference. Wechsler (58) presented a standardized memory scale involving personal and current information, orientation, mental control, logical memory, memory span, visual reproduction, and learning associations. He gives norms for 200 normals with age factors for each five year interval from age twenty to sixty-four years. Stone and his associates (51) suggest a shortened form of the Wechsler Memory Scale based on seven of his subtests. Using a ten-minute test for reproduction of fifteen visual designs, Graham and Kendall (19) suggest that the instrument, while invalid for detecting brain damage, may be useful as a memory test. Eysenck and Halstead (13) made a factorial analysis of fifteen memory tests and a test of intellect. They found that one general factor accounted for 74 percent of the score variance. The correlation of each memory test with the test of intelligence ranged from $+.63$ to $+.96$ implying that there was no need for postulating a memory factor.

Studies of General Interest

Goldstein (18) shows that the abstract attitude is impaired with frontal lobe damage. He indicates, however, that the appraisal of such affect depends upon the nature of the task or test. Aldrich (2) using the Vigotsky test shows correlations ranging from .22 with the Object Assembly of the

Bellevue-Wechsler to .73 with the Picture Arrangement. Further, controlling measured intelligence, there was no difference between post-addicts and normals on the Vigotsky.

Sward (52) gave an elaborate mental test to forty-five university professors aged sixty to eighty years and to a comparable group age twenty-five to thirty-five. He finds that individual differences far outweigh age differences. Such differences as are revealed favor the younger men. The losses tend to be related to disuse and speed. Vocabulary, however, shows the older superior to the younger.

Eysenck (14) showed male *senile dementia* cases averaging at the eight year level of the individual Progressive Matrices. The errors, however, were of the kind that normal adults make.

Burton and Joël (9) present adult norms for the Watson-Glaser Test of Critical Thinking. Oakes (37) showed that the explanations of simple experiments were better when made by adults, but when lacking knowledge, the explanation was as naive as a child's.

It was shown (28) that workers under age twenty and over fifty do less well on job information tests than do those in the age range twenty to fifty years.

Test Standardization

Gurvitz (22) criticizes the standardization of adult intelligence tests and suggests the utility of the 1940 U. S. Census for quota control on norms. The use of the method is illustrated for the "Kellogg-Morton Beta" (32) together with reports on the relation of the revised Beta to the Wechsler-Bellevue.

Pressey (40, 41) showed that altho *peak* performance is around twenty years of age, formal schooling is being prolonged progressively. He pleads for a shortening of formal schooling so that intellectually elite may utilize the more productive years of their lives.

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CHAPTER IV

Personality Development

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MUCH of the significant work on personality development in the recent period has been a result of combining concepts and methods of psychology and social anthropology. Sears (72) foreshadowed this approach in his review of three years ago. He pointed out that theories of learning and motivation had developed to the point where they could be applied usefully to the study of environmental conditions under which personality is, for the most part, learned. During the same year, Mowrer and Kluckhohn (55) contributed an admirable and provocative statement of a dynamic theory of personality.

Several investigations following the "personality and culture" approach have been reported recently. Three of five integrative studies of Indian personality undertaken jointly by the U. S. Office of Indian Affairs and the Committee on Human Development of the University of Chicago have been published. Thompson and Joseph (82) were responsible for the initial report on the Hopi; MacGregor (53) had the collaboration of Hassrick, and W. E. Henry in a study of the society and personality development of the Pine Ridge Sioux; Kluckhohn and Leighton (44, 50) brought together the research done among the Navaho, the second book being devoted to personality development as it is influenced by the way of life of "The People."

A research group at Columbia University has continued to develop the technic of psychodynamic analysis for the study of the relationships between personality and culture. In a book which describes the basic personality pattern for each culture, Kardiner (42) analyzed data supplied by Linton on the Comanche, by Dubois on the Alorese (22), and by "West" on "Plainville, U. S. A." (85). Benedict has made a rather similar analysis of Japanese character (12). These several studies of Indian and other simple and complex societies have a common emphasis on the importance of the early social experiences of the child in the formation of his personality.

Analogous studies of child development in the various social classes of the American society have shown how systematic personality differences arise between the American cultural sub-groups. Notable in this respect is the recent book by Davis and Havighurst (19).

A second significant area of personality research has been that of factor and syndrome analysis. Jenkins and Hewitt (39), by studying inter-correlations of various personality traits, came to the conclusion that there were three characteristic types of personality found among children in child guidance clinics. These types were described as the overinhibited

child; the unsocialized, aggressive child; and the socialized delinquent who is well adapted to his immediate group but gets in trouble with adults and with the wider world. Studying the backgrounds of these three categories of children, they found evidence that each type of child had been subjected to a peculiar kind of frustration. Moreover, the general pattern of behavior itself was exemplified by other persons with whom the child was in close contact.

Cattell (18) reviewed the research on personality description and measurement with special attention to the factors and syndromes which had been discovered. He found twelve "primary traits" or factors in personality which seemed to be clearly established by a variety of research. In a report on his studies of constitutional factors in personality, Sheldon (73) included the latest form of his "scale for temperament." From her clinical experience, Horney (37) delineated three types of neurotic conflict which she believed to be based on three different "solutions" of the young child's problem of "basic anxiety," or the reactions he experiences when he feels himself helpless and alone in a hostile world. She concluded that the child learns to meet this problem either by *going toward* people, *going away* from people, or *going against* people. Thus the child tends to become a *compliant* person, or a *self-sufficient* person, or an *aggressive* person. .

A third area of personality research may be termed that of "ego-personality." This is quite different from the "personality and culture" approach already mentioned, tho not in conflict with it. Books and articles by Allport (1), Lecky (49), Cantor (15), and Axline and Rogers (6, 67), fall in this field. They all stress the importance of self-motivation or ego-involvement in human behavior. Cantor described a teaching process which leads to self-criticism, self-discipline, self-motivation, and responsibility on the part of the student. It should be noted that Rogers and his colleagues are evolving a theory of the self as an active, insightful, integrating process.

Technics for the Study of Personality Development

Research workers in the field of personality development have amplified the nature and use of projective technics. Information obtained by their use may be related to the data on observed or overt behavior obtained in the interview and other technics of the field worker, in subjects' reports and personal documents, and thru psychometric and sociometric instruments. One should realize, tho that much of the usefulness of the projective technics depends upon the skill of the investigator and the adoption of a suitable frame of reference for organizing and interpreting the data meaningfully.

Sargent (71) has provided a useful survey of projective methods in personality research to 1945 with a bibliography of 274 titles. The bulk of the publication to date has dealt with the Rorschach method. Ford (26), working with children of superior intelligence and from the higher socioeconomic levels, has found the Rorschach test applicable, with slight modi-

fictions, to children as young as three years. One interesting finding was that boys tended to give movement responses earlier than girls and that girls tended to give color responses earlier than boys. As an outcome of four year's experimentation, Munroe (56) developed an inspection technic for selecting the well from the poorly adjusted in large groups thru the use of a 28-item checklist for evaluating the Rorschach responses.

The Thematic Apperception Technic (T.A.T.) has been employed increasingly in the study of personality and culture. In a significant expansion of its use, W. E. Henry (35) showed that the test, with pictures drawn to fit Indian cultures, could be used with American Indian children of several tribes. Not only did he make interpretations of individual personality structure but he made generalizations about the characteristic cultural pattern of each of the tribes.

From the clinical point of view, Balken and Vander Veer (9) presented examples illustrating the inter-personal dynamics of the test situation and discussed determinants related to several kinds of variable factors in the personality of neurotic children. Using a special set of pictures with high-school boys and girls, Symonds (81) categorized and counted the themes used by them in their stories, thus producing normative data against which to compare fantasy productions of individuals and groups.

The doll-play technic saw a considerable development. Bach (7) made a further report on his standardized doll-play technic for children aged three to five years in which fantasies could be experimentally induced and quantitatively studied. He found definite relationships between fantasy and behavior and concluded that the technic might be used for both research and therapeutic purposes. In matched-group experiments with children three to six years of age, Phillips (60) and Pintler (61) investigated the effects of varying factors in the projective doll-play situation. J. and Z. Henry (34) observed the doll play of Pilaga (South American) Indian children. They found sibling rivalry patterns closely resembling those in the cultures of the United States, except for the relatively small amount of remorse and self-punishing behavior shown by the Pilaga children. This was related to the absence of remorse and self-punishing behavior in the Pilaga culture.

Other projective technics reported were the sentence-completion method used by Rohde (68), Stein (71), and Rotter and Willerman (70); the Rosenzweig picture-frustration test (69); the World Test by Bolgar and Fisher (13); and the interpretation of children's drawings of animals by Bender and J. Rapaport (11). In an experiment involving fifty-five college women, Waechner (84) interpreted spontaneous drawings and paintings over a period of the time to obtain a picture of developmental changes as well as to confirm and supplement Rorschach findings about the personality pattern. A two-volume study by Alschuler and Hattwick (4) demonstrated that children's paintings parallel and express their emotional experiences and personality development.

A trend toward the use of intelligence tests to get evidence on personality and adjustment has continued. Much of the work has centered around the Wechsler-Bellevue test of adult intelligence. Escalona and D. Rapaport (24) summarized the work which has been done and described the uses which might be made of intelligence tests. They concluded that tests may be used to differentiate between the manifestations of congenital mental deficiency, of specific disabilities, and of various types of maladjustments. Anderson (5) pointed out that modern methods were being evaluated more critically in the light of the complexity of child behavior and development.

Processes in the Formation of Personality

Research on processes in the formation of personality has been concentrated largely on the preschool child, on the assumption that the child's experience during this period has basic and continuing effects upon him. From a Freudian point of view, Ribble (66) analyzed the child's physiological and affectional experiences with the mother and related them to personality development. As an outcome of studies of the effect of the mother's emotional attitude on the infant, Dunbar (23) concluded that exhaustion thru overstimulation and the inhibition of growth thru overtraining are just as harmful as maternal overprotection. Baruch and Wilcox (10) found that child adjustment was related significantly to interparental tension and that girls were somewhat more affected than boys. Regarding jealousy as a normal response to actual, supposed, or threatened loss of affection based on the child's possessive love for the mother, Vollmer (83) discussed the variety of reactions thru which the engendered tension is discharged. Following up earlier experimental studies with intensive investigations of the life histories of fifteen adolescent institution children, Goldfarb (30) concluded that psychological deprivation in infancy results in a basic defect in total personality, manifested especially in inferior concept formation and a passive approach to the solution of emotional problems. In an analysis of some aspects of feeding behavior of seventy-two children, Baldwin (8) found that good appetite tended to appear in homes where the child received approval and conformed with "spontaneous happiness"; and that children with good table behavior tended to be found in homes with more severe discipline where the child conformed due to a pattern of fear and social isolation. Friedlander (27) studied the case histories of twenty-seven children who later became psychotic and found that extremes of discipline or overindulgence by parents were common. She established generalized patterns of early home life for those who later became schizophrenics and those who developed psychopathic personalities.

Gesell and his associates (29), without attempting to relate the child's behavior to the social environment, have continued studies of the first five years of life by presenting a developmental study of the patterning of

behavior to the tenth year. He presented a set of cross-sectional characterizations of the typical child from five thru ten years of age. Gesell's approach (28) is radically different from that of the researches described above. He is interested in developmental trends or laws which he believes to be present in the lives of all children. The other people are concerned with differences which arise in children due to variations in the social environment.

Stolz and Stolz (78) reported their study of the effects upon personality of different physical growth patterns during adolescence. They showed that some boys and girls become disturbed about rather typical physical developments and may suffer from emotional problems as a result, simply because the peer culture defines another pattern as more desirable.

Development of Attitudes, Values, and Interests

Facets of personality are revealed in individual attitudes towards persons, things, and idea systems; in the kind and intensity of valuation or rejection of these outer realities; and in the nature of the positive affiliations as well as in the manner of identifying with or imitating them. Systematic explorations of these aspects of personality are to be found in the previously mentioned studies of simpler societies (42, 44, 50, 53, 82). In the Indian Research Projects significant information was obtained from the Emotional Response Test and the Moral Ideology Test which are described in the reports (50, 53).

Comprehensive studies of attitudes, values, and interests are rare in the case of research done in more complex societies. In a continuation of researches outlined in *Explorations in Personality*, Murray and Morgan (57) presented a detailed case study of the sentiments of eleven college men toward war, religion, parents, and sex.

The development of prejudices was the object of some investigation. Allport and Kramer (2) analyzed questionnaires given to 437 college students and summarized their findings in twenty-seven assertions. Two of these generalizations were that prejudiced people have unpleasant childhood memories of members of groups against whom they are prejudiced; and that prejudices tend to develop most frequently during the ages of six to sixteen. However, in an analysis of recent studies in the dynamics of prejudice, Lippitt and Radke (52) concluded that stereotypes are only later rationalizations of sentiments acquired earlier in life; that dislikes of other groups are taken over in childhood as part of the socialization process; that stereotypes are independent of and not affected by contrary personal experiences; and that reorientation of the prejudiced person involves studying the facts under guidance to the point where they are able to accept them and change their attitudes or it involves changes in the culture as a whole.

Havighurst, Robinson, and Dorr (32) studied the development of the ideal self in childhood and adolescence by categorizing "ego-ideals" in

an essay, "The Person I Would Like To Be Like," written by subjects in different age groups. With increase in age there appears to be a tendency to move from family figures to glamorous persons and attractive and visible young adults, thence to the composite imaginary person, there being some differences according to social status.

In a study of adolescents' food habits in relation to family training and present adjustment by means of questionnaires given to college students and to their mothers, Hellersberg (33) found that 72 percent of the subjects showed a close correspondence with patterns of mothers.

By analyzing activities preferred by boys and girls between ten and fourteen years of age, Hildreth (36) found supporting evidence for the observation that girls mature earlier than boys in social interests, these differences being related to their physiological sex maturation.

Personality Change and Adjustment in Maturity and Old Age

This section of the review, the first on the particular topic to appear in the REVIEW OF EDUCATIONAL RESEARCH, covers studies published between 1944 and 1947. Previous research is summarized in the recent reviews by Kuhlen (45), Jones and Kaplan (40), Eysenck (25), and Kaplan (41). As these sources indicate, a substantial body of data has been accumulated regarding personality change during the adult years. Research of the type reviewed here provides a developmental perspective in which the life significance of adolescence or other phases may be better understood, and a basis for understanding the changes occurring in parents and teachers as they age—an understanding which is especially important since adults constitute highly significant aspects of the child's environment. Furthermore, the basic significance for adult education of data regarding the more mature learner is obvious; the relevancy of such data to more general educational problems is illustrated by Pressey's summary and interpretation of certain facts regarding adult years as they relate to educational acceleration and professional training (64, 65).

Shortcomings of the Data on Adult Years

Research on maturity and old age must be cautiously interpreted. In general, the findings give more insight into differences between age groups within the *present* population than into the changes that present young people will experience as they grow older—tho, to be sure, the data are not devoid of meaning with respect to the latter trends. The facts must not be overlooked that *young people of today are maturing in a culture different from that which influenced the development of their elders* and will reach old age under a still different set of circumstances. The relative paucity of studies in this field may result in unsound generalizations being drawn from a single existing study, simply because contradictions among investigations using different population samples or different procedures have not yet had opportunity to appear.

Cultural Factors in Aging

To no small extent the particular problems faced by individuals of any age and the general level of adjustment of older people is a function of the status they are accorded in society at large, a function of attitudes toward the aging process and toward the aged. Simmons (74, 75) has analyzed a number of primitive cultures with respect to the status of the aged, noting the vast differences among cultures in treatment accorded the old and the relationship of such treatment to their personality and adjustment. It is significant that the American culture is in certain important respects unfriendly to aging. Census data, discussed recently by Pollak (62) and by Lebergott (48), demonstrates the older individuals are more frequently unemployed. Casety (17) has recently cited evidence confirming previous data indicating a general aversion among employers against hiring older individuals—this despite the fact that ability of a substantial level remains well into old age and individual differences are, if anything, more pronounced. Dinkel (21) has shown that young people of high school and college age vary considerably in the extent to which they believe children should be economically responsible for the care of their aged parents. These data are interpreted as indicating that old people no longer have the security characteristic of a generation ago. Several writers (80) have proposed certain problems in this area needing investigation and have suggested methods by which they may be studied.

Age Differences in Interests and Attitudes

Studies of interests provide information regarding the life activities of people and give insight into their motives, needs, and personalities. Data published prior to 1944 have indicated a trend toward increasing dislike for changing activities and toward sedentary, relatively solitary, and fewer interests and activities with increased age. Such trends in *inclination* to learn are of as great significance for adult educators as changes in *ability*, and the tendency to restrict interests may be a major factor contributing to general maladjustment in older groups.

Age differences in radio interests have been reported by Lazarsfeld and Field (47). Older groups show greater interest in religious programs, talks on public issues, news broadcasts, old familiar music, and a decreased interest in popular music, plays, and comedy programs. Link and Hope (51) made a general survey of adult reading, finding that altho the percentage reading books and going to the movies decreases with age, radio listening and newspaper reading hold up fairly well. The relative value of various media for reaching older adults is thus implied. Lassner (46) reported less frequent attendance at movies and plays, less of a tendency to identify self with the play, and more of a tendency to attend movies and plays for purposes of relaxation, as age increases. Patrick (59) investigated the carry-over of a variety of children's activities to adult life by correlating present activities of twenty to thirty-year-old adults with their recalled

participation before thirteen. As one would expect, correlations were low. Alexander (3) has studied aversions, reporting briefly that older people show no tendency toward having more antipathies; actually, those over thirty had fewer antipathies than those under thirty but the difference was not reliable.

From time to time various public opinion polls report age differences in attitudes. Each issue of the *Public Opinion Quarterly* (79) summarizes the "quarter's polls." In general, specific attitudes reported there reveal a more "old-fashioned" point of view among older age groups, greater conservatism and less readiness to approve new ideas and changes. Cantril (16) reports that age is one of the factors making for extremes in attitudes. A synthesis and interpretation of public opinion and market poll data (much of which is unpublished) would represent an important contribution to present knowledge of age differences in representative samples of the population.

Personality and Adjustment

No comprehensive studies of age trends in personality have appeared during the period of this review, tho certain exploratory investigations or subsidiary findings have been reported. Guilford (31) reported older people to be less carefree, but this was the only subtest of his personality schedule to show a significant age change. Klopfer (43) administered the Rorschach to fifty old people, ages sixty-two to ninety-three. Their responses indicated a somewhat lowered intellectual efficiency, restricted thought content, constriction with respect to reactions both to inner promptings and to emotional stimuli from the outer environment. Sward (80) tested an older and a younger group of college professors with intelligence tests and reported that the older group (sixty to seventy-nine years) made many more self-belittling comments indicative of strong feelings of inferiority and self-depreciation than did the younger group (twenty-one to forty-two years of age). There is occasional reference (e.g., 58) in the wartime psychiatric literature to the factor of age in the neuroses, the older group being slightly more susceptible to the stresses of military life and combat. Pollak (63) has examined the social maladjustment of older men as reflected in crime records, noting a characteristic pattern of delinquency among the old and the relatively high frequency of certain crimes, particularly sex offenses. Brookover (14) studied the adjustments of veterans to civilian life. The older groups more often wished to return to their old jobs and were less desirous of educational or vocational information or training. Taken together, these miscellaneous studies imply that older individuals meet problems different from those of the young, are more serious and less confident in dealing with them, and react to frustration in characteristic ways.

Relatively little has yet been done either to plan programs for promoting the better adjustment of the old or to evaluate the effectiveness of such programs as are in operation. The work of Martin (54), who described the

technics used in the San Francisco Old Age Counseling Center, and of De Gruchy (20), who published informal case reports illustrating the application and effectiveness of these technics, thus have special significance.

The Future of Research on Aging

The prospect for research in the field of aging is encouraging. Recent growth of interest is indicated by (among other developments) the establishment of two journals dealing with aging (*Geriatrics*; *Journal of Gerontology*) within the past two years. A comprehensive research planning report on Social Adjustment in Old Age (76) has been prepared by a subcommittee of the Social Science Research Council, and certain agencies are interesting themselves in the financial support of such research (38). Possibly the most immediately helpful research will be concerned with methodological problems relating to technics for studying individuals of widely varying ages, with personality changes revealed by longitudinal studies, with a more thorough analysis of cultural attitudes toward aging, and with the investigation of changing values, motives, and adjustment problems with increased age.

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CHAPTER V

Social Development

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THE preceding chapter deals with the more individual aspects of personality. This chapter deals with social adjustment and the influence of social groups in the formation of personality.

Social Adjustment

Social adjustment involves two complementary processes, orientation and socialization. *Orientation* is the process thru which an individual finds channels for expressing his inner motivations in a system of social relationships. Every individual has to dovetail his behavior into a society, or some social group within a society. His problem is to learn skills and technics, rules and sanctions, symbols and value-attitudes, which permit him to maintain his place as a social being in the society and, at the same time, give him a sense of personal identity. *Socialization* is the process of presenting alternative channels for individual behavior together with positive and negative sanctions which will lead to the acceptance of some and the rejection of others. It emphasizes the influence of social groups, formal and informal, upon the personality of the individual. As a resultant of the socialization process, the individual learns a culture. Each social group teaches certain common and standardized ways of doing things, of behaving and of believing, characteristic of its culture. When inner motivations are incompatible with culturally acceptable expressive channels, and when the individual is forced to comply without compensating satisfactions, neurotic compensatory satisfactions are sought.

Since complex societies have a number of different kinds of social groupings, each with its sub-culture, social adjustment varies from segment to segment of the society. Depending upon the way in which different investigators identify these segments, and upon their various preferences in explaining behavior in terms of orientation to or socialization by social groups, there are several distinct research approaches to the study of differential social adjustment.

Some approaches are concerned with groupings on the basis of age, sex, and physical strength factors, and their relation to social adjustment. Bonney (7) found some sex differences in social success and personality traits in three groups of fourth-grade children. Pupil choices, teacher ratings, and self-ratings (obtained by analyzing responses to the California Test of Personality) consistently favored the girls. Jones (22) selected the ten strongest and the ten weakest boys in a normal urban school population of seventy-eight seventeen-year-old boys by tests of physical ability. The strong boys were found to be superior in social

prestige, personal adjustment, and freedom from anxiety, but they revealed a poorer school adjustment in comparison with the weaker boys. The latter showed a tendency toward poor health, social difficulties, feelings of inferiority, and personal maladjustment on the revised and extended form of the Rogers Test of Personality used in the study.

Other research workers prefer to identify deviants within a society and study their social adjustment. Barker, Wright, and Gonick (5) have reviewed the literature on eighteen types of physical deviations in relation to the problem of personal adjustment to physical handicap. Gates (14), compared eighteen matched pairs of crippled and noncrippled boys and girls. He concluded that cultural backgrounds and personal-social relationships, particularly in the family, may affect personal-social adjustment more than crippledness. In a study of 373 high-school girls, Silverman (37) administered the P.E.A. Interest Inventory 8.2b to groups of girls rated highest and lowest in appearance by their teachers. The group rated as being significantly poor in appearance were more negativistic, more withdrawn, more self-effacing and less interested in people and social activities than the group rated highest in appearance. Two other areas of deviancy were represented by Harris' appraisal of delinquency in adolescent girls in wartime (17), and Smith's study of pupils dropping out of a mid-western high school (38).

Social Development in Simpler Societies

In her review of research on primitive children, Mead (29) not only discussed the systematic differences between fully-aculturated members of different living cultures but emphasized the importance of research on children of primitive societies as a means of constructing and refining theories of personal and social development. In a later article Mead (30) suggests research in simpler societies with the cultural pattern as one factor in the development of total personality and the innate maturation pattern of the Gesell-Ilg approach as another.

From the data on simpler societies, Kardiner (23) abstracted a series of fourteen key integrational systems. These were found to operate in different ways, in the several societies studied, to socialize the individual member and to establish a hierarchy of "systems of basic personality structure" characteristic of the particular culture to which the individual must orient himself. To Kardiner, character variations are different modes of achieving socially defined goals. As societies grow more complex, the person whose character formation permits him to be self-assertive can achieve the most highly approved goals. This brings in the concept of social mobility in relation to character formation and the status-class-prestige complex. Whether or not Kardiner's psychodynamic analysis is entirely valid, his approach is most provocative and suggestive of further research projects.

With regard to the Indian Research Project, it is evident that a number

of factors operate to produce different kinds of social development in the several societies. In the Hopi individual, as depicted by Thompson and Joseph (40), there is a strong feeling of support from a cohesive group. This requires conscious conformity to the group pattern along with rigid suppression of any strong impulse. Kluckhohn and Leighton (25, 27) examined the processes thru which Navaho society provides group support with an extensive periphery for individual freedom. For "The People," witchcraft has been a means of defining and personalizing an individual's anxiety in a way that will give him imaginative release. Moreover, he is accepted by others who will help him thru the curing rites. The Sioux society, as presented by MacGregor (28), is a picture of disorganization. The positive directing influence of the white schools during childhood and adolescence find few counterparts in adult roles and codes. The society generates a feeling of ineffectiveness and helplessness in a world which, for the most part, is looked upon as hostile and dangerous.

Kluckhohn (24) outlined preliminary results of a longitudinal study of forty-eight Navaho children from a single community, the study being in its eleventh year. Tentative comparisons were made between the social development and personality manifestations of these children and those of two other Navaho communities, one being more acculturated and the other less acculturated in relation to white society. Comparisons were made also with typical children from the Hopi and Sioux tribes. Goldfrank (15) examined the relation of child-rearing practices to adult personality patterns in two Pueblo Indian societies, the Hopi and the Zuni. Despite early leniency, which would presumably predispose them toward secure and easy-going types of behavior, the older children exhibited fearfulness and sadness in projective tests in excess of middlewestern children. It was concluded that severe disciplines imposed after the period of infancy by external agents—impersonators of the supernatural and members of the priesthoods—are personality determinants as important, if not more so, than the training of infancy.

In a comparative study, Tulchin and Levy (40) administered the Rorschach test to twenty-two matched pairs of Spanish and English refugee children from ten to fourteen years of age. The Spanish children were found to be more compliant and anxious, intellectually less abstract, emotionally more responsive and outgoing; the English, more reserved, introspective, less patient, revealing more verbalization, and less demonstration of affection.

The Effects of the Family, Peer Group, School, and Other Social Structures

The individual, from childhood to adulthood, has interrelated and interdependent memberships in a family of orientation, a peer group, a school, probably a church, and possibly in several kinds of adult-organized and adult-controlled social and economic activities. West's social anthropo-

logical study of *Plainville, U. S. A.* (43) clearly demonstrated the socializing influence of these structures in a semi-rural society.

Frankl's report of preliminary results of the study of children and mothers in a well-baby clinic (12) pointed up crucial situations in the social-emotional development of the infant and child. Lafore's monograph (26) related dictating and interfering behavior by the parent to hostility in the child; blaming and punishing to crying; and ignoring and diverting to teasing and nagging. By means of his standardized doll-play technic, Bach (4) studied twenty pairs of father-separated and father-home children, six to ten years of age. He found that the father-separated children produced an "idealistic and feminine fantasy picture" of the father when compared with the control children, who elaborated the father's aggressive tendencies. In a similar investigation of 126 boys and girls, father-separated and father-present, aged three to five years, R. Sears, Pintler, and M. Sears (36) studied the specific problem of fantasy aggression. Among the conclusions they reached, two might be cited. Boys from father-absent homes portrayed much less fantasy aggression than boys from father-present homes. Girls from father-absent homes portrayed slightly more aggression than girls from father-present homes.

The place of the children's culture in social development is still largely unexplored by research. Tryon's article on the adolescent peer culture (41) discussed the changes in behavior of boys and girls thru pubescence and adolescence, the differentiation of the social-sex roles in the peer group, and the relationships of the subadult society to the dominant adult social structures. Much definitive work remains to be done, especially in delineating the goals, the roles, the intra-group and the extra-group tensions, the codes and the technics of enforcing codes in the peer culture.

In a study of the social and emotional adjustment of regularly promoted and nonpromoted pupils, Sandin (35) compared 139 pupils who had failed of promotion at least once in grades one to eight with 277 fellow students. Employing a number of technics—interviews, observation, sociometric and rating scales, evidence was built up in regard to the negative effects of nonpromotion on social development. However, the investigator did not refer to the special cases, the effects of nonpromotion on the physically under-developed and the socially immature individuals. In a consideration of the problem of school discipline, Hacker and Geleerd (16) claimed that adolescents with emotional disturbances can be handled with better results and with a more favorable prognosis when treated with firm authority, rather than with an atmosphere of unlimited freedom without restrictions.

Social Class Differences

In his article on socialization and adolescent personality, Davis (9) delineated the three broad systems of social rank which circumscribe

development and behavior in our complex society—the social class, the ethnic group, and the color class systems. Davis and Havighurst (10) analyzed the data from guided interviews with 50 mothers of young children in each of four groups, white middle-class, white lower-class, Negro middle-class, and Negro lower-class. They found that the social class differences in child-rearing practices were greater than the differences between Negroes and whites of the same social class. Middle-class families, white or Negro, were more rigorous in training for feeding and cleanliness habits and began such training earlier. They also found some color differences. Negroes were more permissive than the whites in the feeding and weaning of their children. However, they were much more rigorous than the whites in toilet training. Davis and Havighurst concluded, on the basis of their sample, that there are *cultural differences* in the personality formation of middle-class compared with lower-class people, *regardless of color*, related to their early training. Moreover, they suggested, there are less marked but identifiable cultural differences between Negroes and whites of the same social class. Part of this study, dealing with the differences between middle-class and lower-class white families, had been reported earlier by Ericson (11).

Havighurst and Janke (19, 21) studied the relationships between various abilities and social status among ten-year-olds and sixteen-year-olds in a typical midwestern community. Their reports show that children from families of high social status did consistently better on several tests of intelligence and mental ability than children from lower status families. However, on the Minnesota Mechanical Assembly Test there was no social class difference for sixteen-year-old boys altho a significant difference appeared in the case of ten-year-old boys.

In a sociometric study of the aforementioned sixteen-year-old and ten-year-old groups, Neugarten (33) found that both the friendship status and the reputation of these midwestern school children paralleled the social class position of their families. Children of higher status families were more popular and had better social reputations. Age changes in these factors were related to changes in the constitution of the groups and to the decrease in adult control.

Even in less complex semi-rural communities, these social class differences would seem to appear. In his previously mentioned book, West (43) found an unexpected discrimination system which assigned rank and provided patterns of expected behavior for every individual and group in the community.

Warner and Srole (42) reported upon the eight ethnic subsystems of Yankee City. The forces that operate to maintain a variant cultural tradition as well as the processes by which succeeding generations distribute themselves thru the social class levels of the community were examined in detail. Case material has been utilized to portray the "social personality" of the individual, especially in the process of social mobility.

Group Relationships

Group relationships, as such, have been studied in a number of contexts using various methodological approaches. Morgan (32) investigated the social relationships of 274 children in a war-boom community, grades four to eight, 60 "oldtimers" and 214 "newcomers." He used a sociometric technic to measure social participation, and a "Guess Who" test to study social reputation. He found that a child's reputation and status were based partly upon his actual behavior and partly upon the picture people carried in their minds about the social group to which he belonged. Length of residence in the community was not significant nor was place of residence, except that children living in trailers were accorded an unfavorable position. Cook (8) also reported on a sociometric study, finding consistent relationships between social class background and friendship choices.

Sociality, the impulse to be social, was investigated by Hartley (18) using a sample of 140 boys, ten to twelve years of age. Three tests, Pictorial Extensity, Measure of Special Friendships, Measure of Acquaintance Volume, appeared to discriminate between groups of boys judged to be very social and very unsocial in relation to their peers. Hartley concluded that a certain amount of aggression, flexibility, sensitivity to the situation, dominance, and tolerance of others are involved in successful social relationships. In another monograph, Newman (34) demonstrated the use of "composite" and "integral" behavior rating scales, as well as anecdotal and conference records, in the study of adolescents in social groups.

In studies of teacher's classroom personalities, H. H. Anderson and his co-workers (2, 3) investigated the effects of teachers' dominative and socially integrative contacts on children's behavior. It would appear that "integrative" teacher behavior encouraged "integrative" pupil behavior; that "dominative" teacher behavior not only provoked conflicts and misunderstandings but stifled "spontaneity" and social development of the children. Moreover, a change in the classroom group did not change significantly the pattern of individual behavior. On the other hand, a change in teachers did result in a change in pupil behavior.

Group therapy has been the central procedure in a number of studies. Gabriel (13), working under the supervision of Slavson, presented the results of group therapy experiences with six girls from fifteen to seventeen years of age. From the group interplay, Gabriel concluded, the girls gained insight by seeing themselves in others, in a not too threatening way. In a large day camp, Hewitt and Gildea (20) made provisions for four unadjusted girls, aged seven to nine years, to meet in a group with another child of high social adjustment. As a result of the group interaction, personal needs became apparent. Later, the children became much better adjusted to the large group. Baruch (6) reported a project in group therapy with 23 college students. At the end of the sessions, twenty-three of the twenty-five members indicated positive outcomes. Moreno (31) described the functions of the stage, the subject, the director, the staff of

auxiliary egos, and the audience in the psychodrama as a method of group psychotherapy.

The Role of the Teacher in Social Development

The report of Prescott and his co-workers on the staff of the division on child development and teacher personnel (1) focused on helping teachers understand children. The book told how teachers of one school system gained new insights into the nature of child growth and behavior. They utilized facts and understandings gathered thru observation of children and making anecdotal records. Additional facts and understandings about the structure and dynamics of classroom groups were gleaned by the use of sociometric technics and group observation.

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CHAPTER VI

Motor Development

ANNA ESPENSCHADE

THE past three years have produced nothing of importance in the investigation of motor development in infancy or early childhood. Much has been added to knowledge of adolescent changes in motor performances, however. The war provided impetus for experimentation in the measurement of physical fitness of high school and young adult age groups. Emphasis in this area has been placed upon changes brought about by training. The availability for experimentation of large numbers of men in the twenty-one to forty age group has thrown light on motor changes in these years, also.

Age Changes and Sex Differences in Adolescence

Growth in fine motor abilities in adolescent boys and girls has been reported by Jones and Seashore (31). In some functions, as reaction time, growth has apparently reached its limit by fifteen years while in others as serial discrimination, the gain at fifteen is as great as in previous years. For the battery as a whole, girls are slightly retarded as compared with boys. Sardon (47) tested Peruvian children on manual coordinations and found a regular increase in capacity with age. He found girls to be inferior to boys in manual celerity.

The development of gross motor coordination in boys and girls as measured by the Brace Test was studied by Espenschade (19). Six hundred and ten children were tested and the results were compared with those obtained in the California Adolescent Study. The increment pattern for boys of total scores on the test battery is similar to that of adolescent growth in standing height. Scores for girls show little change after the thirteenth year. All tests for boys in which dynamic balance is a factor show a marked "adolescent lag." Sex differences are small before the age of 13.8. After that time, boys excel in all events and their superiority increases at each age level. Differences are most marked in agility.

Strength of right and left grip show almost identical growth curves in boys from eleven to seventeen and a half years. Jones (28) shows that boys at age twelve reach about 50 percent of the manual strength they are to have at seventeen and a half. Growth in strength of pull and thrust proceed at almost identical rates, also, but not until the age of thirteen and a half does the boy show 50 percent of the strength he will at seventeen and a half in these measures. For girls at twelve years of age, both grip and pull strength are at approximately 70 percent of the seventeen and a half level; push or thrust strength matures still more rapidly, and is at approximately 80 percent of maturity at twelve years. Performances

of boys in running, jumping, and throwing are relatively more mature than strength. At thirteen and a half years, these measures are from 75 to 85 percent of the seventeen and a half level. Mean scores for grip strength of boys and girls in the California Adolescent Study are included in *Development in Adolescence* (27), a report of one individual with the group as background.

The influence of physiological age on the physical strength of boys was studied by Crampton early in the twentieth century. In order to make this work readily available, it has been reprinted in *Child Development* (9). The relation of physiological maturity in boys to physical activity has been noted by Espenschade (20). Jokl (32) studied the relation of menarche to performance in strength, speed, and endurance events by forty white South African school girls. He found the postmenarcheal group tended to surpass in strength, the premenarcheal in endurance. In static dynamometric strength, Jones (30) found postmenarcheal girls were stronger than premenarcheal girls of the same chronological age. The premenarcheal growth spurt in strength begins about one year before menarche and reaches a peak close to the time of menarche. Late maturing girls lag behind the average at all ages.

Measurement of Motor Ability

A cutting-out test for measuring motor control in children eight to thirteen years of age has been developed by Mandeville (40). Scores on this test showed no relation to IQ, sex, or age but depend mainly on manual skill. Brozek (6) has proposed a new group test of speed of hand and arm movements. Tuchman (51, 52) has examined the reliability of the Minnesota rate of manipulation test with various subjects, and individual testing as compared with group testing. The measure is highly reliable altho the group situation produces better scores.

The Oseretzky scale for measuring genetic levels of motor proficiency has been adapted for Portuguese children by Leita da Costa (38). An English translation from the Portuguese has been published recently (39). Alabastro (1) used this scale to test 260 Italian children and reports that a study of profiles gives important data on development and age differences of motor capacities examined.

Fisher et al (22, 24) standardized measurement in railwalking and with the ataxiograph on young adults. Reliabilities for the railwalking test ranged from .67 to .85; on the ataxiograph from .77 to .92. There was no correlation between tests.

Travis (50) studied dynamic and static equilibrium by means of a stabilometer and an ataxiograph. Results from the two measures are unrelated. Visual cues were found to aid greatly in the performance in both tests. Weight is significantly related to dynamic equilibrium in both men and women. A small sex difference in favor of women was found. Travis (49) also investigated the relationship between balance and recovery from rotation. A correlation of .52 was found.

A procedure by which both strength and endurance can be measured on the hand dynamometer has been developed by Fisher and Birren (23). The test is highly reliable and has some degree of validity. Some improvement with practice occurs. The strength of college women can be measured by performance tests such as the push-up and pull-up with relatively high validity, according to Wilson (56). Studies in the methodology of chinning, sit-up, leg lift, and other measures of muscular strength and endurance have been reported by Cureton et al (12), DeWitt (17), Kappovich et al (34), and Wedemeyer (54). The study of Cureton et al deserves special mention as twenty-eight exercises were analyzed kinesilogically and evaluated statistically.

A valid and reliable test of motor fitness for high-school girls has been published by O'Connor and Cureton (43). The test measures balance, flexibility, agility, strength, power, and endurance. Bookwalter (4) found sufficient relationship between height and weight and performance of high-school girls to indicate that a classification scheme for activity would be of value. Such a scheme is proposed. Tests as the Brace, Johnson, Seashore Series A rhythm, and the like can be used to measure the capacity of college women to learn dance technics, according to Benton (3). The stunt-type test has been shown to be susceptible to practice (21), but results on practiced tests are equally valid. A thoro study of tests to measure the sports ability of high-school girls has been published by Anderson and McCloy (2).

A short screen test for predicting motor fitness of college men has been developed by Cureton, Welser, and Huffmen (11). It consists of seven items which can be given in thirty minutes to a large group. Phillips (45) has proposed a JCR (jump, chin, run) test for the assessment of ability of men in fundamental skills. Scoring tables are included.

Influence of Training

Junior high-school boys were tested by Daughtrey (13) in speed, strength, accuracy, and coordination events at the beginning and at the end of a school term. One half of the group were given no specific instruction whereas the others were carefully taught. Neither group improved in shot-put or broad jump. Eighty percent of the trained group improved in all other events while only 56 percent of the control group improved.

Adolescent boys in the first nine months at the Physical Training Battalion in Pretoria grew in bulk, on the average, at a rate five times as great as they would have in their unsatisfactory home environment, according to Craven and Jokl (10). The amount of improvement to be expected of high-school girls in one year on the battery of tests recommended by the U. S. Office of Education has been computed from 4500 records (53). The average improvement represents roughly an increase equal to about one half of one standard deviation on the original scales.

Several investigators have studied changes in performances of college women. Smalley and Smalley (48) report improvement in strength significant at the .01 level of confidence in an eight-week period. Mohr (41) obtained significant improvement in several tests but none in the push-up or step test. Petrosky (44) found gains in abdominal and arm strength but not in running or jumping. A greater percentage of those with low scores at the beginning showed more improvement than did those whose first scores were medium or high. Women who obtain low scores in fundamental sports skills upon entrance to college improve more in special classes than in regular sports classes, according to Salit (46). Davies (14) reports that a complex motor skill is acquired more rapidly by college women and reaches a higher level when regular and expert instruction is given.

Cureton et al (12) tested both high-school boys and college men at the beginning of the term, after one week, after twelve weeks, and after the thirteenth week. Improvement in the first week is attributed to initial adjustment in the twelve weeks to training and in the last week to final motivation. Over-all improvement in endurance exercises averaged 10.4 percent.

A number of reports of training programs for the armed forces have been made. Clarke (8) found that air-crew students after a three-month training period scored well above the average college student on the Rogers Strength Index. Only 25 percent failed to reach the college norm. Wieman (55) traced the improvement which took place in 78,260 ASTP students in speed, strength, and endurance in twelve weeks. He noted that older men improved more slowly. Karpovich and Weiss (33) tested 4172 men aged eighteen to forty who were in the Army less than one month, then retested after three months' training. Greatest deficiencies upon entrance were in arm strength. Marked improvement occurred in speed and in endurance as well as in strength. Larson (37) reported the construction of fitness tests for the Army Air Force and the results obtained from this program. Measures of strength, speed, coordination, and endurance were included. Standards were established which were reached by 23 percent at the beginning of training and by 92 percent at the end. A progressive and uniform retrogression in fitness with increase in chronological age was found in every component. The reports of Dawson (15, 16) regarding the influence of aging on power and endurance in man should be noted in this connection, also.

Relation of Motor Abilities to Other Factors

Kopp (35) gave the Oseretzky test to fifty stuttering children and found that according to Oseretzky's categories, 20 percent of the stutterers showed some motor deficiency, 26 percent severe deficiency, and that 40 percent were classed as motor idiots. This test has not been standardized for American children.

The railwalking test was used by Heath (25, 26) to select extreme motor

deviates in the Army. He has analyzed the mental pattern found in such individuals. This same test was used by Myklebust (42) to study motor performance of deaf children. The subjects, aged five to twenty-one, showed progression with maturation. There were marked sex differences with the males decidedly superior. Individuals whose deafness was due to meningitis were markedly inferior in motor performance.

Brozek et al (7) examined motor performances of young men who were given a partially restricted and later an acutely deficient diet in vitamin B complex. No decline in performance was noted under partial deficiency but deterioration significant at the 5 percent level was found during acute deficiency in gross bodily reaction time, pattern tracing, and ball-pipe. No differences in tapping or speed of finger movements were found.

The learning of fundamental motor skills by children in an average school was compared with that of children in a school for mentally retarded children (36). The subjects were fifth and sixth-grade children. Groups superior in intelligence learned about twice as much as subnormals in the more difficult tests. Girls were superior to boys in learning.

Boys high in physical strength tend to have good physique, to be physically fit, and to enjoy a favored social status in adolescence, according to Jones (29). Boys who are low in strength show a tendency toward an asthenic physique, poor health, social difficulties and lack of status, feelings of inferiority, and personal maladjustment in other areas.

Negro and white tenth-grade girls do not score significantly different in the Brace Test battery (18) altho differences in favor of the whites are found in two subtests of balance with the eyes shut and of leg strength, flexibility, and control.

Nature of Motor Abilities

A factor analysis of mechanical abilities by Wittenborn (57) yielded six factors, three mental and three motor. The motor factors were identified as stereotyped movement, manual dexterity, and steadiness. Further investigation (58) of so-called manual dexterity tests showed that they were made up of size (maturity), strength, spatial visualization, and true manual dexterity, which is dependent largely upon tactual and kinesthetic modalities and independent of vision.

Cureton (12) identified four primary factors in tests of muscular endurance: lateral muscles, limb locomotor muscles, arm extensor muscles, and running endurance.

In a study of motor learning, Brace (5) distinguished two types: "sport-type" learning which relates to performances involving the use of speed, strength, power, and dexterity in manipulating the body in control of some object, and another type which involves gross bodily motor activities not related to an external object nor requiring marked use of strength, speed, or power.

These studies tend to confirm earlier studies which have found motor abilities to be relatively specific in nature.

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CHAPTER VII

Physiological Factors in Development

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THE present review deals primarily with studies appearing since the publication in the December 1944 *Review* of the summary by Shock (44). Certain topics covered in the previous reviews have not advanced significantly and are, therefore, omitted. Areas of greatest research activity in this general field include the following: (a) the effect of prenatal conditions, such as maternal disease and diet, on fetal and neonatal development; (b) the developmental effects of anoxia at birth; (c) the effects of diet on growth and development; (d) the effects of diseases on development; (e) the physiological aspects of adolescent development.

Prenatal Development

Maternal Influences: The disease rubella (or German Measles), often regarded as a mild disease of childhood, has recently been shown to have potential importance in the etiology of congenital defects (19). Investigators (3, 17, 36, 52) have found that among infants with congenital defects such as cataracts, deafness, and anomalies in the structure of the heart, a large proportion have been born to mothers suffering from rubella during the first and second months of pregnancy. On the other hand, many mothers suffering from rubella during the early months of pregnancy have given birth to normal infants (16). Altho the association of maternal rubella and congenital defects is apparently greater than chance, other factors are involved.

Maternal Agglutinins: The subtle influences of the maternal organism on fetal development (other than the placental transfer of nourishment and removal of wastes) are well illustrated by recent studies on the Rh isoagglutinins of the blood. Here gross pathology in the child has been shown to result from certain incompatibilities in the blood composition of the mother and the developing fetus (38). This general concept has been expanded in observations of Yannet and Lieberman (60), who reported a high incidence of such blood group incompatibilities among 119 low-grade mental defectives. The authors believe the cerebral abnormality of nineteen of the cases could be related to maternal Rh isoimmunization during pregnancy.

Maternal Blood Chemistry: Sontag (48) has reported instances of impaired postnatal development in children born to mothers who were emotionally disturbed during the pregnancy. He believes that the developing fetus was adversely influenced by the physiological disturbances of the mother. While this concept is an attractive one, in accord with the physio-

¹ The assistance of Miss Charlotte Fox in the preparation of the bibliography is gratefully acknowledged.

logical facts of placental transmission, the extent to which changes in blood chemistry may alter subsequent mental development is not yet known. These observations on maternal-fetal relationships offer a potentially fruitful field for further investigation.

Maternal Diet: Observations on the effect of maternal diet on the offspring have been greatly expanded during the past three years. The studies carried out at the Harvard School of Public Health have been effectively summarized by Stuart (51). Without question weight, body length, vitality, and rate of ossification may be influenced by the amount of protein in the maternal diet. Even tho the babies born to mothers living on poorer diets are smaller, the incidence of difficult birth, toxemias of pregnancy, and other maternal diseases is significantly greater than in mothers receiving adequate or good diets. On the basis of these studies (7, 8, 43) it has been recommended that the caloric intake during pregnancy be increased from the normal values of 2200 to 2400 calories to 2600 to 2800 calories and that the protein intake be increased from the normal adult value of sixty grams per day to eighty-five or even 100 grams per day. It is also recommended that the intake of calcium, phosphorus, and iron as well as vitamins A, B (thiamine, riboflavin, niacin), C (ascorbic acid), and D be substantially increased during pregnancy. It has also been shown that the incidence of vitamin deficiencies in the mother are greater among pregnant women than among normals.

In states of near starvation, such as that prevalent in western Holland in May 1945, a significant reduction in fetal weight and length was observed (47). With the restoration of the maternal food supply, the birth weights returned to prewar levels. A slight but statistically insignificant increase in malformations of the fetus was also reported. It is important to realize that this study is based upon conditions of generalized under-nutrition, during a relatively brief period of time. The effects of prolonged selective malnutrition, such as that observed by Stuart and others, may produce more marked effects on both mother and fetus.

In animal experiments where severe vitamin deficiencies in the mother can be experimentally produced, it has been shown that certain fetal anomalies of development occur. Riboflavin deficiency in the mother inhibited the formation of the skeleton in the fetus (53, 54). Maternal Vitamin A deficiency resulted in congenital defects of the eye of the newborn (55, 57, 58). It is not known whether the results of these acute experiments in animals can be applied to humans or not.

While not all of the above-mentioned relationships between the fetal and maternal organisms can be regarded as definitely established, there are sufficient indications that this area should be further investigated.

Birth Asphyxia and Birth Injuries

Altho reports of the importance of asphyxia at birth in retarding subsequent mental development continue to appear (9, 39), the crucial experiment comparing intelligence test scores on siblings, one of which was

anoxic at birth and the other normal, has yet to be done. Preston (39) has attempted to distinguish between two groups of children, one of whom was hyperactive as a result of a lesser degree of anoxia and the other apathetic as a result of a greater degree of anoxia. In a study of 132 such children subjected to varying degrees of anoxia at birth, ninety-seven were found of average or higher intelligence; twenty-three were dull or borderline; and thirty-five were subnormal. The investigator thus believes that a differential effect on physical, mental, nervous, and emotional as well as personality development may appear in children who experienced post-partum anoxia. The earlier such anomalies of development were recognized, the more hopeful was the prognosis for avoiding behavior problems in the children. Significant improvements in the relationship of children and parents were observed when the parent was shown that the disability of the child was a physical one. Furthermore, the emotional and personality development of such children could be improved thru training.

In animal experiments where relatively severe degree of neonatal asphyxia can be produced, it has been shown that such asphyxia is followed by impaired learning ability (59).

Dietary and Nutritional Influences on Mental Development

General Nutritional Level: A number of investigators have studied the effect of dietary improvement on school performance. MacKenzie (29) reported a rough positive relationship between nutritional status and scholastic attainment, when both variables were classified into three broad categories. A somewhat more convincing study is that of Kugelmass, Poull, and Samuel (27), who determined the effect of nutritional improvement on test intelligence in 182 children between the ages of two and nine years. Half of the patients were institutionalized, whereas the other half were outpatient cases. The group of children, which was malnourished at the time of the first mental test and well nourished at the time of the second test, showed a rise of ten IQ points for the retarded group and a rise of eighteen points for the mentally normal, in contrast with an average zero change for the group well nourished at the time of the first test and still well nourished at the time of the second test. There was a correlation of $-.56$ between the age at the time of the first test and the IQ rise. The investigators interpret this negative correlation as evidence of a greater chance of improvement in mental function, the younger the malnourished child is when nutritional therapy is instituted. They regard the relative constancy in the IQ change in children above the age of four years as evidence for the irreversibility in mental development following prolonged malnutrition. Other studies have indicated similar trends (37).

Altho certain writers are convinced that neurotic, psychopathic, or even criminal tendencies may be associated with low-blood sugar levels in children (25, 26), quantitative data on blood sugar levels are conspicuous by their absence.

Vitamin Supplements: Attempts to improve growth and mental development by the administration of vitamin concentrates have usually met with little success. Mangold (30) was unable to demonstrate any significant improvement in height, weight, school attendance, or performance on school examinations in children who were given two milligrams of thiamine a day over a three-month period.

Positive results from thiamine administration have been reported, however, in a carefully controlled study by Harrell (22). In this study children were carefully matched with respect to height, weight, age, sex, educational achievement, length of residence in the orphanage, and intelligence test scores. Altho the orphanage was located in Virginia, the selection of experimental groups and the total number of tablets, whether thiamine or placebo, were sent in sealed envelopes from New York. Thus, the experimenters in the orphanage had no knowledge of which treatment the children were receiving. A total of fifty-five pairs ($N=110$) children were tested. The experimental groups received two milligrams of thiamine per day over a one-year period. At the end of this time significant differences between the experimental and control group were observed in visual acuity, reading, memorizing of new material, code substitution, and educational achievement. At the end of the first year twenty pairs of children were reversed; i.e., the child who had been receiving thiamine in the first year was placed in the placebo group during the second year. At the end of the second year tests were given the children again. It was found that in most instances the child who had been receiving thiamine in the first year of the experiment, but a placebo in the second, was now surpassed by his matched companion who had been treated with thiamine during the second year. This is the most carefully controlled experiment that has appeared in this field. It gives strong support to the conclusion that mental performance can be influenced by thiamine intake. It is also evident that long periods of administration of the vitamin may be necessary for demonstrating positive results.

Amino Acids and Mental Development: The importance of amino acids on growth and development has long been recognized. The essential amino acids are obtained by chemical breakdown of protein ingested in the diet. The animal resynthesizes the amino acids absorbed from the gut into new proteins within the animal. A recent study has indicated the potential importance of one of these amino acids, namely glutamic acid, in mental development. Striking improvement in eight children between the ages of sixteen months and seventeen and a half years by Zimmerman and his coworkers (72, 73). The administration of six to twenty-four grams per day over a period of six months was followed by increments of as much as four years in mental age within the six-month treatment period. The average increase in Binet IQ's was eight points in the eight children tested. Children who were of subnormal intelligence at the first test showed the greatest increments in mental ages. It has also been reported that the retest records

showed more dynamic responses, suggesting a change in the basic personality structure of the individual as well as improvement in mental performance. Physiological mechanisms whereby the improvement in mental performance takes place have not been elucidated. However, biochemical studies have shown that glutamic acid is the only amino acid known to be metabolized *in vitro* by slices of brain tissue (56). It has also been shown that glutamic acid reactivates one of the important enzyme systems which is concerned with the transmission of the neural impulse (33). Zimmerman and Ross (63) were able to speed the learning of a maze by white rats treated with glutamic acid. Similar experiments have been reported by Albert and Warden (2). This is suggestive evidence that more experiments are required in order to definitely establish the relationship between glutamic acid feeding and mental performance.

The Effects of Diseases on Development

During the course of infectious diseases, physical growth in children is often impaired. However, permanent retardation in growth or development has not been demonstrated. No relationship was found between frequency of illness and final body size (21) or personality development in adolescents (20), nor could it be said that children who showed exceptionally low growth rates were absent from school due to illness more frequently than normally growing children (31). No evidence of permanent detrimental effects on school success due to illnesses such as asthma, bronchitis, chicken pox, etc., could be found among 200 pupils (9). Normal growth may be attained even in the face of such diseases as tuberculosis (40, 49). Disease processes do not themselves seem to be determinative in personality development; but the social and psychological reactions of others, particularly adults, to the disease and the treatment accorded the sick child, particularly during convalescence, may have extreme importance in the genesis of personality and behavior disorders (6, 15). Opposed to this conclusion are the studies of Lurie and Levy (28) who believe that neurologic sequelae of whooping cough in young children may be a factor in the development of a social or abnormal behavior in later life, and of Richter (41) who believes that a temporary syndrome of anxiety and depression with compulsive, obsessive, phobic thinking and behavior may develop as a result of mild upper-respiratory infections in children. Studies of crippled and physically handicapped children emphasize the importance of the social environment rather than physiological characteristics of the handicapped in influencing mental and personality development (5, 32).

Personality and psychological changes have been reported following certain diseases in which a secondary involvement of the central nervous system may occur. Examples of such diseases are pneumonia (4, 34), malaria (42), and pernicious anemia (1, 13) as well as the usual encephalitic diseases (20, 40). Psychological reactions in patients suffering from

poliomyelitis have been reported (11, 50). In general, the patients reacted with depression and anxiety when they realized the nature of their disease. Patients with bulbar signs tended to have greater psychologic disturbances than those with only spinal paralysis. These reactions were amenable to psychiatric treatment as indicated by Rorschach records taken before and after therapy (11).

Fisher and Dolger (14) reported the results of their follow-up study from forty-three diabetic patients who had suffered from the disease from early childhood. With the severe limitations imposed upon the child by his disease, certain behavior problems seem to be more prevalent among the diabetic children than among normals. The investigator believes that the type of behavior problem which was apt to appear was determined chiefly by the attitude of the parent. Parents who are over-solicitous seem to generate a submissive, dependent, apathetic type of problem, while parents who show resentment and rejection of the child because of his disease seem to generate rebellious, belligerent behavior on the part of the child. Here again it is important to note the importance of the social environment in the development of behavior abnormalities.

Eisele (12) has examined the subsequent development of seventy-three cases of diabetes in patients who had the disease for twenty years or more. In all cases the disease was first discovered in early childhood or youth. Children who developed diabetes before the discovery of insulin (1922) had small chance of survival. However, with adequate control of the disease by the proper use of insulin, the survival rate of diabetic children approaches that of normal children. Emotional maladjustment was significantly greater in the diabetics than in normals. The educational achievement of the diabetics was high (42 percent attended college compared with 7 percent of the general population). This may be the result of economic selection, since the patients studied probably came from high economic groups.

Adolescent Development

Jones (23) has shown that in boys static dynamometric strength is relatively independent of gross body size, but a combination of size and body build provide a fairly adequate representation of the factors determining strength. Strength correlated .52 with weight, .33 with height, and .34 with mesomorphy as determined by the Sheldon rating technic. In girls, growth in strength was correlated positively with sexual maturity (24).

The physiological responses to severe exercise were measured in the same group of 100 children as they progressed thru adolescence and attained maturity (44, 45). After measurements of pulse rate, blood pressure, and oxygen intake were made under basal conditions, each child climbed five flights of stairs as rapidly as possible and then lay down on a cot. Continuous measurements of pulse rate, respiration rate and volume, oxygen intake, and carbon dioxide elimination were made over a forty-five-

minute recovery period. Systolic and diastolic blood pressure measurements were made at one to one and a half minute intervals. From the data collected, recovery curves were plotted for each variable for each experiment. Analyses of these observations indicate that altho the work output increased as children matured, the rate of recovery with respect to physiological factors such as pulse rate, blood pressure, and oxygen consumption diminishes with increasing age over the adolescent span.

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CHAPTER VIII

Physical Growth from Birth to Maturity

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RESearch on physical growth has been varied during the interval since the last review, but three major trends deserve mention.

First, in exploring developmental aspects of growth there has been a continued emphasis upon longitudinal investigations of the same children thru time. This plan of research makes possible studies of individual variation in rate of development, and for a given sample size yields smaller standard errors for growth increment means than does the cross-sectional approach. Sample shrinkage, a major practical problem in longitudinal research, has been dealt with by workers at the Brush Foundation (63) by adding cases as needed and analyzing the data in terms of overlapping age groups arranged so as to permit "splicing" together the results for different stages of development.

Second, there has been an emphasis upon the investigation of patterns of morphological variation among individuals, and of the relationships between physique, temperament, disease, and physical capacity. Interesting in this connection is the application of factor analysis to sets of anthropometric intercorrelations in an attempt to define mathematically the dimensions of growth and physical differentiation.

Third, there has been an emphasis upon the integration of research findings from various sources. The last three years have perhaps produced fewer reports than heretofore on major investigations, but have been noteworthy for several comprehensive reviews including both published and unpublished findings on special topics (e.g., 15, 35, 37, 67, 73). These contributions have colligated and evaluated an extensive and scattered literature which the nonspecialist finds it difficult to correlate, owing to innumerable variations from study to study in sampling procedures and statistical treatments. However, these reviews suggest that much research effort would have been more productive had samples been more adequately selected and defined, and had anthropometric technics been applied in a more standardized fashion.

Factors Conditioning Growth

Geographic and racial influences: Cluver and co-workers (12) compared the stature and weight of white school children in America, Canada, England, and South Africa. The relative superiority in stature of the South Africans and inferiority of the English was attributed to climatic factors. Meredith (41) presented body size comparisons for African Bantu children and American children of three racial stocks. Michelson (42, 45) supplied data on the American Negro which suggest that differences in nutrition

and general health are more significant than are racial differences per se in accounting for differences in physical growth between white and colored groups. In a careful study, Lasker (31) compared immigrant and American-born Chinese of the same stock. He discovered that the American-born were superior in stature, weight, and length of extremities, but had more shallow chests and relatively narrower hips. Andrews (1) reported similar findings for two closely related groups living in different regions of Siam. Both investigators concluded that a broad pattern of change in physical proportions may be induced by environmental factors, especially diet.

Socio-economic and temporal factors: Hopkins (26) reported that growth differences, correlated with socio-economic status, had persisted among Ottawa school children despite the improvement in the financial situation of worker families owing to the war. Laporte (30) offered evidence that Parisian school children who suffered war-imposed dietary limitations over a period of five years were lighter and shorter than a comparable prewar group. Meredith and Meredith (40) compared the data on stature obtained in mass surveys of the Toronto school population in 1892 and 1939. The more recent population was markedly taller. Maximum differences were observed for puberal age groups, suggesting a trend toward earlier maturation as well as greater stature.

Illness and endocrine disorder: Jackson and Kelly (27) investigated the relationship between growth rate in diabetic children and level of control of the disease. Erratic growth reflected fluctuating levels of the disease, but children under adequate control tended to exhibit normal growth. Dunham and Thoms (18) did a follow-up study on the effects of severe rickets in early childhood. All cases in this small sample had some deformation of the lower extremities at adolescence. The half who had rachitic pelvic deformations were older at the time the rachitic process was active than were those who escaped. Bayer (3) and Fancher (22) reported on children with endocrine-caused disorders of growth and discussed their methods of treatment.

Hereditary factors: Bruce and Scott (7) described similarities and differences among a set of quadruplets with respect to height and weight gains and hand ossification. Onset and rate of ossification of twenty-six centers in identical triplets were studied by Sontag and Reynolds (64), who concluded that the genetic pattern of ossification may be modified by environmental factors or acquired metabolic characteristics. Reynolds (51) compared the pattern of ossification among twins, siblings, cousins, and arbitrarily paired children from unrelated families. The closer the degree of kinship, the more similar was the pattern of ossification.

Prenatal conditions: Sontag, Reynolds, and Torbet (66) related basal metabolism determinations on pregnant women to the size of their children at birth. Mothers who had moderately high BMR's produced longer, heavier babies advanced in skeletal maturity. This suggests the inadvisability of administering thyroid to reduce the birth size of the child.

Pubescence: Ellis (21) confirmed previous observations that boys who mature early are heavier and taller between the ages of nine and fourteen years than are those who mature late. Stuart (67) supplied a nontechnical account of the general features of physical growth and development at adolescence. The reader is referred to this article for a summary and review of earlier studies in the field.

Growth—Stature and Weight

Simmons (63) published a comprehensive monograph on the physical growth data secured by the Brush Foundation Study on Child Growth and Development. The sample consisted of a thousand Ohio children, from white families above average in education and economic status. Cross-sectional age-sex norms for some twenty-five anthropometric dimensions and for skeletal maturity were presented together with stature-weight-skeletal age intercorrelations from three months to seventeen years. Special problems were the relationship between physical growth and IQ (correlations offered no basis for prediction) and the relationship between age, height, skeletal development and terminal stature. Bayley (4) determined the percentage of mature height achieved by children of various degrees of skeletal maturity, and published tables for predicting within rather narrow limits of error the ultimate stature of normal children from their skeletal age and height at the time of the X-ray.

Growth of Body Segments and Tissues

Head: Meredith (37) reviewed findings on the relationship between head circumference and age, sex, lineage, diet, birth molding, birth order, etc. Wallis (73) synthesized results from various sources, some unpublished, on sex differences in relation to cephalic index. Boyd (6) offered a formula relating head circumference and body length for clinical use in evaluating the normality of cephalic size and growth.

Pelvis: Reynolds (53, 55) used serial roentgenograms in a careful investigation of the growth of the pelvis from early infancy to nine years. Curves for boys and girls ran parallel courses, but boys seemed to lead in size of outer dimensions and girls in inner pelvic structures. Greulich and Thoms (25) also used serial X-rays to investigate changes in the female pelvis associated with puberty. Time relationships with other puberal changes were noted. Meredith and Carl (39) reported on growth trends in hip width. Palmer (48) measured accurately the center of gravity of the body and showed that it moved down to the upper pelvic region during the growth period.

Extremities: Findings from Davenport's extensive researches on the growth of the extremities were published posthumously (15). They included longitudinal and cross-sectional data on many groups, including comparisons between races, and between normals and dwarfs. The article contains a discussion of errors in research of this type. Meredith colligated published and unpublished findings on arm growth (38) and foot length

(35). He pointed out the need for standardized anthropometric procedures and the gaps in our information concerning nonwhites and children of low socio-economic status.

Skeletal ossification: Elgenmark (20) demonstrated great variation in individual ossification patterns of children between the ages of one and sixty months. He reported that one cannot draw definite conclusions regarding other centers on the basis of differentiation present in a few isolated areas. Leonard (32) gave normal age ranges for the appearance of centers in the wrist. Michelson (46) proposed a method of skeletal assessment based on the progressive maturation of the individual bone, in contrast to Todd's evaluation of the maturation of the total hand and wrist area.

Dentition: Sandler (58) found few significant relationships between age at eruption of deciduous teeth and sex or weight of child or nativity of mother. Meredith (36) supplied an extensive review on the order and age of eruption of deciduous teeth.

Body tissues: Reynolds described a roentgenometric procedure for determining absolute and relative breadth of fat, muscle, and bone tissue in the leg, and described growth changes in proportions of these tissues during childhood (52) and adolescence (54). Stuart (69) described growth trends in childhood by age and sex in the thickness of skin and subcutaneous tissue.

Appraisal of Physical Status and Growth

Sontag and Reynolds (65, 56) described the use of the Fels Composite Sheet in evaluating growth progress, and offered illustrations of deviant individual patterns as related to illness, etc. The chart is arranged so that the development of a child in various dimensions may be recorded graphically in comparable standard score units, based on norms supplied by the authors. Wetzel (74) adapted his grid technic to the evaluation of the direction and speed of physical development in infants. Massler (33) offered a formula for calculating normal weight, based on the product of specific gravity and body volume, the latter arrived at by an approximation procedure. The method is appropriate only for the "normally proportioned body." No evidence as to its value was supplied. Craig (14) compared results from five different methods for estimating the appropriate weight of college women. Marked disagreements in classification of subjects as overweight or underweight were found. The Pryor method classified 56 percent of all subjects as underweight and was considered not applicable to this Wellesley group. Stuart and Meredith (68) evaluated various appraisal procedures in a nontechnical article on the use of body measurements in the school health program. They regarded weight, stature, pelvic breadth, chest circumference, calf circumference, and subcutaneous tissue thickness as constituting the most useful indicators of physical status and growth progress, and described standard technics for measuring them.

They emphasized the inappropriateness of evaluating contemporary school children by reference to norms obtained prior to 1930, owing to the secular trend toward greater size which has been repeatedly demonstrated.

Physique and Morphological Variation

Body build and body proportion: Draper, Dupertuis, and Caughey (17) published a volume based on their extensive researches on the relationship between human constitutional variation and specific diatheses. Draper recognized three main body types—slender, average, and heavy, and described the disease tendencies of each. Attention was also given to androgyny, i.e., the mosaic of male and female characteristics blended in each physique. Emphasis was placed on treating the patient as a psycho-organic whole and on evaluating him in terms of his “individual normal.” Seltzer (60) reported that body disproportions (deviations of anthropometric indices beyond arbitrary limits) in normal young men were associated with autonomic instability, greater sensitivity and complexity of personality, and less adequate social adjustments. Seltzer and Gallagher (62) reported a distribution of somatotypes among white private school boys aged thirteen to seventeen similar to that reported earlier for college groups by Sheldon. Bullen and Hardy (8) applied Sheldon’s somatotyping procedure to body build photographs of college women. They concluded that dysplasia was more common among women and that the range and distribution of somatotypes was somewhat different for men and for women. Since their sample included only women, one cannot exclude the possibility that women assigned to a given somatotype may show a somewhat different patterning of basic components from men of the same somatotype.

Sexual differentiation in physique: Seltzer, Seltzer, and Brouha rated male physiques as to the strength of the “masculine component,” and related this variable to personality assessments made by psychiatrists (59) and to an index of physical fitness (61). Bayley and Bayer (5), making a similar assumption that sexual differentiation can be rated relatively independent of other characteristics of physique, provided an assessment scale and supplied standards for estimating androgyny in members of either sex. This method is unusual in taking account not only of relative maleness and femaleness, but also of the intensity of sexual differentiation from asexual to bisexual. Their data indicated considerable reliability for the rating procedure. Development of sex differences in pubic hair distribution was described in detail by Dupertuis, Atkinson, and Elftman (19).

Theoretical and mathematical contributions: Winthrop (76) made a theoretical analysis of the premises underlying various kinds of biotypologies. Burt (9, 10) and Thurstone (70, 71) applied their factorial technics to the mathematical determination of the number and kind of dimensions required to account for a matrix of anthropometric intercorrelations.

Unfortunately, their solutions are not independent of the analytic methods used. Thurstone's solutions tended to reveal factors for growth in different body areas, e.g., head size, length of extremities, etc., while Burt's produced a general size factor and bipolar factors for body width vs. body length.

Contributions to the Theory and Technics of Research

Medawar (34) developed a method for expressing mathematically changes in the shape of the human body from embryo to adult by a continuous set of transformations in which time is the parameter. This method of analysis makes it possible to compute the rate of change in body shape as a function of position and age. Baker (2) proposed a procedure for graduating human growth curves without breaking them up into short time intervals. Jenss (28) in a nontechnical paper discussed general considerations in statistical methodology, emphasizing the need for control of all relevant factors in studying growth. Tildesley (72) concluded that the choice of a unit of measurement in anthropometry depends not on the accuracy to which a character can be measured, but on the fineness of grouping necessary in order to obtain from the data as reliable an estimate of variability as sample size permits. She supplied data on the variability of seventy characteristics of the body, to assist the researcher in choosing an appropriate unit of measurement. Wilmer and Scammon (75) reviewed the various procedures which may be used in presenting visually the topographic features of the human body. They emphasized the utility and flexibility of iconometrography, ("that branch of graphics that represents two or more bodies or structures . . . by means of figures drawn to some common scale"); for comparisons of the same individual at different stages or for comparisons of different individuals.

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¹ Corrected to January 1, 1948 Report errors immediately to the secretary treasurer.

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